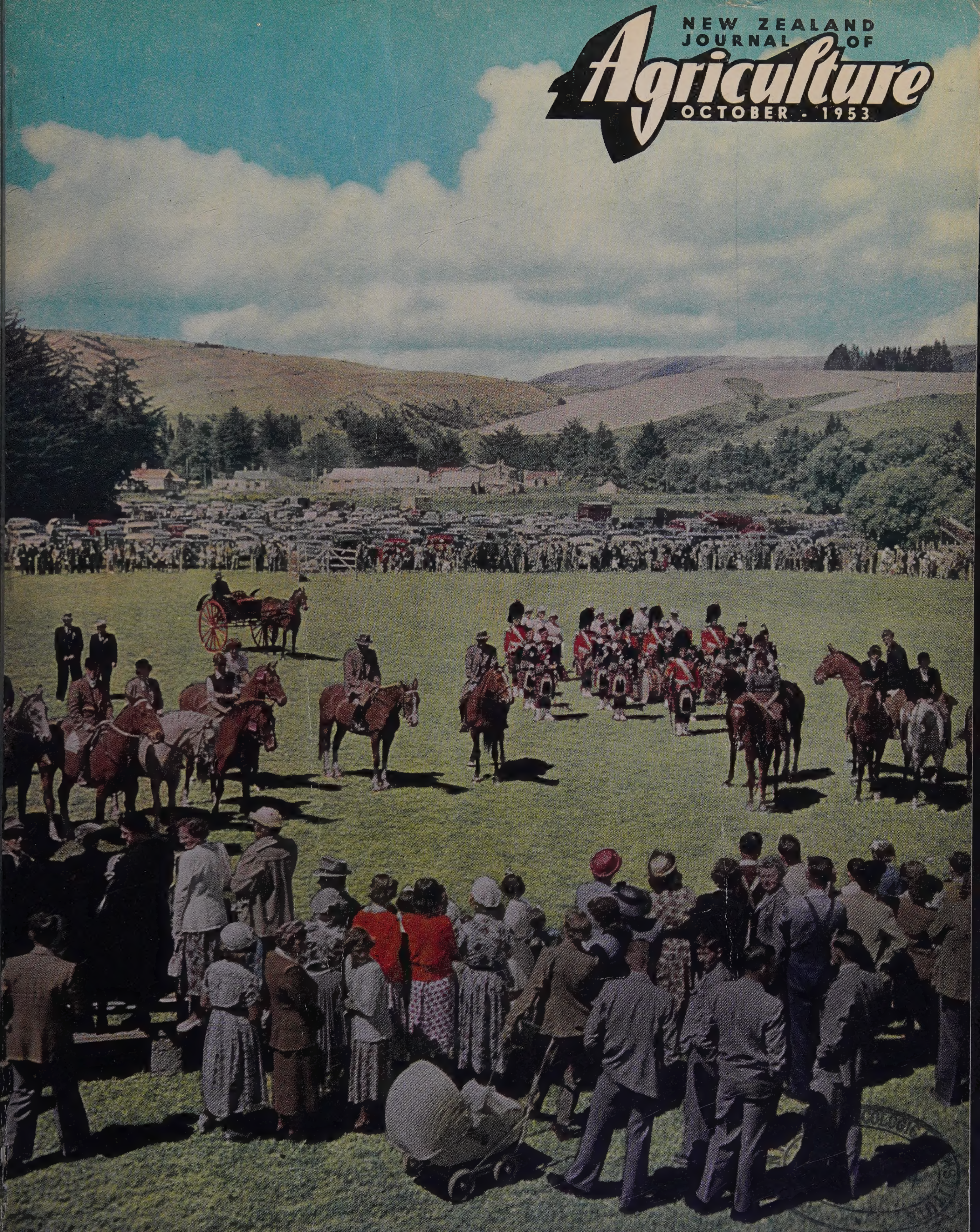
NEW ZEALAND
JOURNAL OF
Agriculture
OCTOBER - 1953



OLOGIC

Cooper News
Cooper's World-Famous Stock Remedies

FARM BULLETIN published by COOPER, McDOUGALL & ROBERTSON (N.Z.) LTD.
World famous Manufacturers of Sheep Dips, Worm Drenches and other Stock Remedies.

No. 32 PUBLISHED EVERY SECOND MONTH October, 1953

LICE
Control with
Gammexane Powder Dips

The ordinary sheep louse has been particularly troublesome during the past year in many parts of New Zealand, but this pest can be dealt with easily and quickly by one efficient dipping. The Gammexane Powder Dips will definitely control lice, and will provide a reasonable period of post-dipping reinfestation protection, but, as with any dip, dipping must be carried out properly if good results are to be obtained.

The main points to be remembered are:—

1. A clean muster is essential. One lousy undipped sheep can quickly infest a whole flock.
2. The instructions on the packet must be followed exactly, especially those referring to replenishment and reinforcement.
3. Thoroughly wet each sheep. Dipping is an operation that cannot be hurried or speeded up, and each sheep must be allowed to remain in the dipping wash until saturation is complete. Do not delay dipping too long after shearing, because the longer the wool the more difficult it is to saturate the fleece.
4. Do not dip sheep in wash that has become excessively fouled. Clean out frequently and fill with fresh wash.
5. Do not allow dipped sheep to come into contact with undipped sheep, especially after the post-dipping protection period has passed.

If these five points are followed, control of lice is assured with Gammexane Powder Dips.

Again Available . . .
COOPER'S MAGGOT DRESSING

After temporary withdrawal from the market for technical reasons, this very effective product is again available packed in 1 pint bottles. Apart from healing properties and aid in preventing re-strike, the objective of a fly strike dressing is to eliminate maggots from the wound so that none remain to putrify—Cooper's Maggot Dressing is designed for this purpose.

COOPER'S MAGGOT DRESSING:

1. Is not irritant.
2. Non staining.
3. Highly concentrated—1 pint makes 4 gallons of dressing.

"COOPER" Brand DRENCHES ARE YOUR SAFEGUARD

There is a Cooper drench to meet your requirements whatever they may be

COOPAZINE POWDER provides phenothiazine in its most economical form. 1lb. drenches 20 to 30 sheep or 10 to 20 cattle. Packed in 1lb. and 10lb. tins.

COOPAZINE LIQUID comes to you ready to use in a convenient tin for carrying. Remains in suspension during drenching. 1 gal. sufficient for 106 to 160 sheep or 53 to 106 cattle.

COOPAZINE TABLETS for quick, clean drenching. 3 tablets for lambs and 5 for adult sheep.

COOPER'S N.C.A. DRENCH. Containing Nicotine, Copper-Sulphate in scientifically combined form. 16oz. bottle sufficient for 160 sheep or 426 lambs, or for 80 to 320 cattle according to age.

COOPER'S FLUKE & WORM DRENCH. Containing Carbon Tetrachloride, the recognised remedy for Liver Fluke. ½ and 1 gals.

COOPER'S POWDER FLY SPRAY

A most valuable aid in the prevention of Fly strike on sheep for a lasting period.

One spraying provides at least 5-6 weeks' protection at a cost of about 3d. per head. 2lb. packet makes 20 gallons spray.

To Kill Parasites on Stock dust with
COOPER'S LOUSE POWDER

Lice and other parasites on your cattle, horses and stock generally cause intense irritation, disturbed feeding and loss of condition. Thanks to the special spreading properties of COOPER'S LOUSE POWDER and its remarkable persistence in the coat,. ONE dusting is normally sufficient to kill all lice present and destroy any young ones hatching from the nits. It will effectively destroy keds and lice on stud sheep if infestation occurs at a time when dipping is undesirable. Supplied in handy 1lb. duster top cartons, COOPER'S LOUSE POWDER should be on every farm.

OTHER PRODUCTS

COOPER'S MARKING PENCILS, in neat, telescopic tubes for instant use, Red Blue, and Black.

COOPER'S FOOTROT OINTMENT. For hand dressing bad cases, 4oz. jars.

COOPER'S FOOTROT LIQUID. Arsenical, does not make hoofs brittle, ½, 1, and 5 gals.

C.M.R. MARKING FLUID. Meets requirements of both grower and manufacturer, 1 gal. drums, Red, Blue, and Black.

TRI KOS PISTOL. Handy, well-made suction-type drenching pistol.

LAVENE. Excellent wash for treating show or sale animals. Gallons and quarts.

FLEXOPAD. Automatic branding appliance. Eliminates wastage and mess.

COOPER'S DAIRY OINTMENT. Dairy and general veterinary ointment. 2lb. and 10lb. tins.

VICTOR GUN. Excellent automatic gun for all water based drenches.

BECK GUN. Efficient automatic gun for phenothiazine tablets.

Write for particulars of any of the above products.

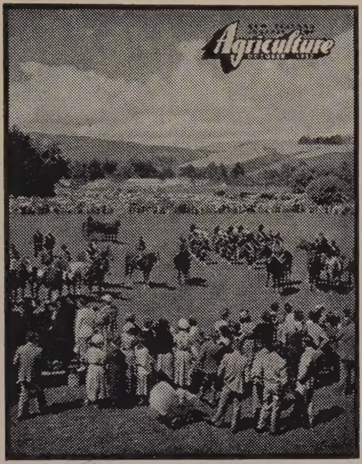
All the products featured on this page are obtainable from Stock and Station Agents and Merchants, or write to:
COOPER, McDOUGALL & ROBERTSON (N.Z.) LTD., Box 599, Auckland.

Volume 87
Number 4
15 October
1953.
(Established 1910)

NEW ZEALAND
JOURNAL OF
Agriculture

Published by
Direction
of
Hon. K. J. Holyoake,
Minister of Agriculture.

This Month's Cover



Competitions for livestock were fostered in the very early days of the settlement of New Zealand and interest has grown with the great development of pastoral farming. Another agricultural and pastoral show season has now begun and fixtures will be held in centres throughout the country until the late autumn. This month's cover, which was reproduced from a colour photograph by Tom Lloyd, shows groups of horse events competitors and spectators at last year's West Otago show, at Kelso. The next Royal Show, to be staged by the Southland Agricultural and Pastoral Association at Invercargill on 27, 28, and 29 January, will be visited by Queen Elizabeth and the Duke of Edinburgh.

New Zealand Department of Agriculture

HEAD OFFICE:
Dominion Farmers' Institute Building,
Featherston Street, Wellington.

DIRECTOR-GENERAL:
E. J. Fawcett

ASSISTANT DIRECTOR-GENERAL:
R. B. Tennent

DIVISIONAL DIRECTORS:
Animal Industry .. J. E. McIlwaine
Animal Research .. .. J. F. Filmer
Dairy .. .. H. A. Foy
Extension .. .. P. W. Smallfield
Horticulture .. .. A. M. W. Greig
Marketing .. .. K. B. Longmore

Editor: G. J. Neale

TABLE OF CONTENTS

Soil Advisory Service of Extension Division	E. B. Davies	306
Feeding Synthetic Vitamin A to Laying Pullets	F. C. Bobby, J. J. Thompson, and W. R. Belworthy	313
Meteorological Records		316
Protecting Sprayer Operators from Poisoning	C. J. Crosbie	317
Care of Livestock during November		320
Dairy Produce Graded for Export		320
Pasture Management on Dairy Farm (Seasonal Notes)		321
The Home Garden	C. L. Napier and S. O. Gillard	323
Production of Quality Pig Carcasses	A. Longwill	331
Turnips and Swedes for New Zealand Conditions (Colour Section)	J. O. Wallace	Between pages 336 and 337
Sheep-carrying Capacity Trials at Winchmore	G. K. McPherson	337
Avian Leucosis or Fowl Paralysis	J. J. Thompson	339
Surface Drainage on the Hauraki Plains	G. L. Banfield	345
Radio Broadcasts		348
Sac-brood: The Need for Better Bees	L. A. M. Griffin	349
Pasture Improvement on Light Land in Mid-Canterbury	R. Inch	352
Citrus Verrucosis and Bark Blotch	F. L. Bailey	364
Recent Research Work: Phosphatic Fertilisers		367
Domestic Beekeeping	T. P. J. Williams	369
Precautions with Organic Phosphorus Insecticides	H. Jacks	371
Household Poultry	H. K. Mullins	377
Show Dates		378
The Flower Garden	R. R. White and H. P. Thomas	379
Making Reading Lamps	Eleanor Couston	385
Planning Housework	Maud B. Strain	391
Well-planned and Varied Menus are the Basis of a Healthful Diet	Evelyn E. Moore	396
Ovenware	Nell Macpherson	397

SUBSCRIPTION RATES

The "Journal" is issued monthly. The subscription within New Zealand is 10s. a year; the overseas subscription is 13s. (sterling). The "Journal" may be ordered from any bookseller or newsagent, or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 2298, Wellington, at 1s. a copy, post free.

Subscription inquiries (preferably accompanied by the address cut from a recent "Journal" wrapper) should be sent to the nearest office of the Department of Agriculture.

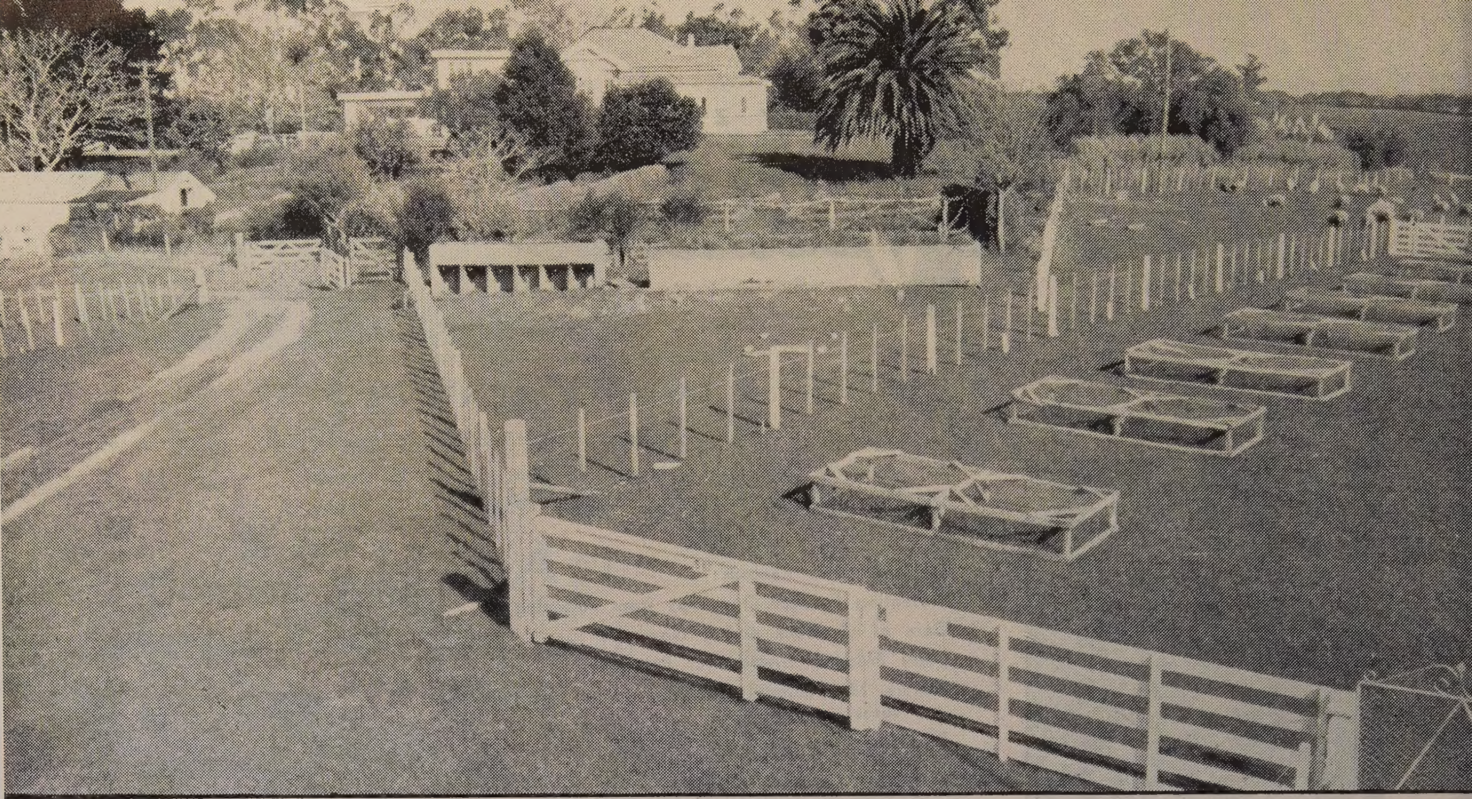
COPYRIGHT PROVISIONS

Articles in "The Journal of Agriculture" are copyright, but may be reprinted, **provided both the "Journal" and author are acknowledged.**

The Minister of Agriculture does not accept responsibility for any of the private and trade advertisements included in this publication.

All correspondence relating to the "Journal" should be addressed to the Editor, "The New Zealand Journal of Agriculture", P.O. Box 2298, Wellington.

REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE.



Soil Advisory Service of Extension Division

THE present soil advisory service of the Extension Division, Department of Agriculture, gives information concerning the soil reaction (pH), and calcium, potassium, and phosphorus supplies as an aid to the Instructor in his advisory work. The demand for soil analyses is rapidly expanding and inquiries are also received as to whether tests for other elements can be carried out. This article by E. B. Davies, Senior Chemist, Department of Agriculture Soil Research Station, Rukuhia, gives information about the existing service and also discusses the practicability of additional tests being made available.

THE total content of a nutrient element in a soil is no guide to the state of supply for the growing plant, for only a small fraction can readily become available for plant uptake. The soil is a complex and, to an extent, a balanced system. If the balance for example between the fraction of a nutrient element loosely held on the surface of soil particles and that in solution is upset by plant uptake or drainage loss, then it will tend to re-adjust itself. Potassium, as an instance, removed from the soil solution by plant roots is rapidly replaced from the soil reserve. Whatever the nutrient, it is this rate of replenishment which is the critical factor in plant growth. It cannot be readily assessed. All the chemist can do, at least with rapid tests, is to extract the soil with solutions chosen so that the amounts of the various elements removed by them correlate reasonably closely with the supplying power of the soil. It is expedient for the one extractant to suffice for all elements, an aim achieved to an extent in the Morgan Soil Testing System. In interests of reliability it may be better to relate one's extractant to the particular forms of combination in the soil of the element concerned.

Before the present service was initiated, investigations were carried out over several years at the Rukuhia Soil Research Station. Of the very numerous methods employed in other countries a selection was checked against pot, and later field, experimental results. It soon became apparent that methods found satisfactory overseas, often on a restricted range of soils, were not necessarily of general application in New Zealand. Soils developed under particular conditions of parent material, climate, and vegetative cover have their own peculiar characteristics and this fact has to be taken into account. Eventually tests for potassium and phosphorus of fairly general application were selected and tentative response levels fixed. Information accumulated over the past 5 years can now be used in testing these response levels on related groups of soil types, adjustments being made where necessary. Also the circumstances in which a soil test is not reliable are becoming known. As an example, the phosphorus extractant dissolves rock phosphate more readily than does the soil solution. If much rock phosphate has been used, then the soil test will be misleadingly high. Such points have to be kept in mind in interpreting results.

Lime requirement is judged on a joint consideration of soil pH and calcium supply. Local experience and the quality of limestone used also need to be taken into account.

The Steps in Soil Testing

Soil testing can be considered as consisting of four distinct processes:—

1. Taking the soil sample.
2. Extraction of the prepared sample with a suitable reagent.
3. Chemical determination of the element concerned.
4. Interpreting the results.

All steps are equally important. The field man is specially trained in steps 1 and 4 and the research laboratory attends to steps 2 and 3 and co-operates with the field man in the interpretation. For advisory work a speedy handling of samples is essential. Steps taken to achieve this by streamlining steps 2 and 3 are described in the April 1953 issue of the "Journal". Analyses are in general completed within a fortnight of receipt of the soil sample. The importance of correct sampling, step 1, cannot be too strongly emphasised. Twelve to sixteen cores taken over the field concerned are normally required to form a representative sample.

Method of Reporting Results

There are numerous methods of reporting results, for example, by a qualitative description (high, low, medium), as percentage or parts per million of soil, as pounds per acre, or as parts per million of extract. It has

---

HEADING PHOTOGRAPH: Part of the Department of Agriculture's Rukuhia Soil Research Station.

been decided to express all three elements calcium, potassium, and phosphorus by a numerical rating ranging from 0 to 20 on the usual run of soils. This is a change from the earlier practice, but the actual calcium and phosphorus figures will not be materially affected. For those interested the tests used and the significance of the figures are as follows:—

Calcium: Extractant, Morgan's reagent. Soil: solution ratio, 4 : 10. Determination, by flame photometer. Rating, parts per 20,000 of extract.

Potassium: Extractant, Morgan's reagent. Soil: solution ratio, 4 : 10. Determination, by flame photometer. Rating, parts per 200,000 of extract.

Phosphorus: Extractant, as in Truog's method. Soil: solution ratio, 2 : 400. Determination, by spectrophotometer. Rating, parts per 50 million of extract.

Soils analysed in the South Island will meantime be reported under the previous system.

Taking soil samples from a fertiliser trial.

pH, Calcium, Potassium, and Phosphorus

Soil Reaction (pH)

By the term reaction is meant the state of acidity or alkalinity of the soil. It is conveniently indicated by the pH scale extending from 0 to 14. Low figures indicate strongly acid conditions such as in solutions of the mineral acids, 7 represents neutrality, and the highest figures apply to strong alkalis. The pH of normal soils, determined by conventional methods, lies between 4.5 and 8.0 in New Zealand. Certain peats may be as acid as pH 3.5 and marine muds and arid soils more alkaline than pH 8.0. The desirable level tends to vary with soil type, but in general lies about pH 6.0. Field officers of the Extension Division with accumulated local knowledge become aware of exceptions and modify their recommendations accordingly. Pasture can flourish on certain soils with a pH well below 6.0.

Under highly acid conditions phosphate fixation may increase and manganese and aluminium may become active in toxic amounts. Molybdenum is less available.

On the other hand under alkaline conditions boron, iron, manganese, zinc, copper, and possibly cobalt become less accessible to the plant, and molybdenum more available. In New Zealand manganese deficiency has been induced in fruit trees through over liming, and boron deficiency accentuated. In judging trace element supply the soil reaction must always be taken into account.

Calcium

Calcium is an essential plant food. Since limestone is the usual corrective for a low soil reaction, the accompanying calcium deficiency is normally remedied through liming. Certain sandy soils may have a satisfactory reaction but be deficient in lime, small applications being desirable.

Potassium

Potassium is taken up from the soil in greater amounts than any other mineral element, but is largely returned by the grazing animal in urine. Hay and lucerne paddocks from which material is removed become depleted. Profuse growth of clover on urine patches is often due to a concentration of potassium in an elsewhere deficient soil and is a useful indicator.

Potassium deficiency is becoming widespread in the North Island of New Zealand, as shown both by field trials and soil tests. The latter have proved particularly useful in revealing unsuspected deficiencies of this element.

Phosphorus

By far the largest importations of fertiliser into this country have been of phosphorus carriers aimed at remedying the general poverty of the element in New Zealand soils. Requirements are increased by the fact that many soils are strongly phosphate "fixing" and swallow applied phosphate with little diminution in appetite. It is useful to be able to distinguish these soils, as heavier rates of application are needed. A special laboratory test is

BELOW: Applying radio-active phosphate in a "tracer technique" trial.

GIBRALTAR BOARD

IS A DEFINITE

FIRE-STOP

★ ACCEPT NOTHING ELSE FOR ALL INTERIOR WALLS AND CEILINGS

DISTRIBUTED BY WINSTONE LTD

You can't buy better

RED QUALITY

GREY QUALITY

SUPER SOFT

BLACK CARBON TOUGHENED

More farmers use **Reidrubber** milking rubber than any other brand – it's proved itself 'Best by Test'

REIDRUBBER

Specify

Reidrubber

MILKING RUBBER

used for this purpose. The wide variety of phosphorus compounds in the soil makes it difficult to devise a method of general application as a guide to phosphorus requirements. That in use proved the best of a considerable number studied, but as pointed out earlier is unreliable where much rock phosphate has been applied. Work towards eliminating this trouble is in hand. Certain tests for available phosphorus described in overseas publications were found highly misleading on New Zealand soils.

Elements Not Covered by Existing Service

Nitrogen

As organic matter of plant and animal origin decays nitrogen compounds break down with liberation of ammonium nitrogen. This in turn is converted to nitrite and thence to nitrate. The process is continuous, but varies in speed with conditions of aeration, moisture, and temperature. Plants can utilise ammonium and some other nitrogen compounds, but assimilate nitrate to the greater extent. In a fertile soil the rate of supply meets the demand. The prevailing nitrate level may nevertheless be very low. When soil is removed for analysis nitrate tends to accumulate, for it is no longer subject to plant uptake or downward movement in drainage. The level both of ammonium and nitrate determined by analysis often depends, therefore, on the time that elapses between the taking and the drying of the soil sample. Results of such determinations cannot be used confidently in advisory work. The critical test is one of the nitrate supplying capacity, a test too slow for a routine procedure.

A further complicating factor as far as pasture is concerned lies in the clover : grass relationship. The nodule organisms in the clover roots fix atmospheric nitrogen, supplying sufficient for both the clover and associated grass species.

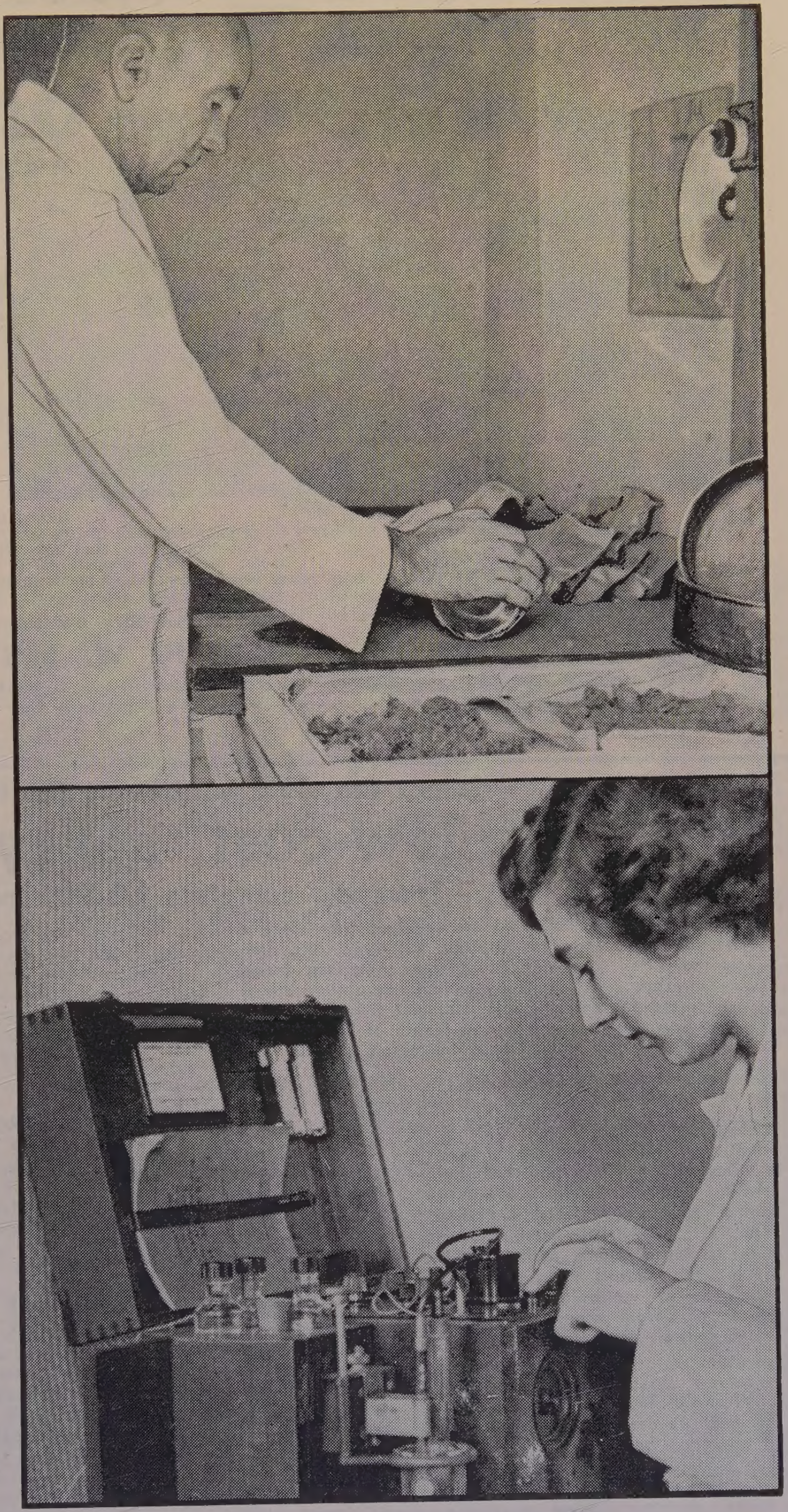
Sulphur

Plants require approximately equal amounts of sulphur and phosphorus, the ratio, as it happens, contained in the fertiliser superphosphate. It has recently been demonstrated that the response to superphosphate in growth of pasture on certain soils with a high phosphorus test is due not to the contained phosphorus but to the sulphur content. Sulphur is readily lost in the drainage as sulphate, and deficiencies may be more common than is realised. The almost universal application of superphosphate would mask the position. In cases of deficiency sulphur-free phosphate carriers such as double superphosphate (or oxalic superphosphate) would prove less effective than the ordinary superphosphate. Trials incorporating such comparisons are being laid down in suspect areas.

Soil tests such as that of Morgan are not likely to prove sensitive enough for diagnostic purposes.

Magnesium

Magnesium responses have rarely been reported in pastures in New Zealand. Instances in horticultural and orchard practice have usually been induced through heavy applications of potassic fertilisers. Nevertheless, continued topdressing with superphosphate tends to accelerate losses of magnesium through leaching, and deficiencies are liable to develop. The



Upper—Preparing soil samples for analysis. Lower—Determining the pH of a soil sample with a pH meter.

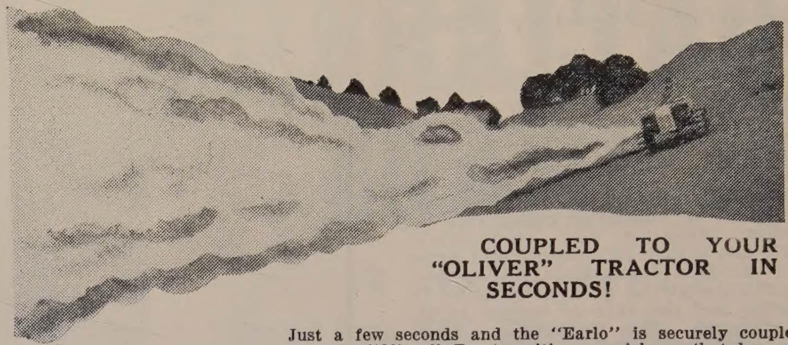
Where there's a hill- there's a way!

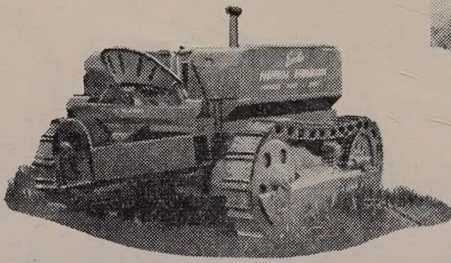
ECONOMICAL HILL COUNTRY TOPDRESSING

WITH AN EARLO AND OLIVER O.C.3

SPINNER-BLOWER WIDE GAUGE CRAWLER

Top-dressing hill country easily fits into your routine farm work when an "Earlo" Spinner-Blower is on the job! Here at long last is a precision machine that efficiently spreads vital fertilizer over the steepest pastures where previously it was impossible to take a truck or too costly to aero top-dress. Now it only costs you shillings instead of pounds to top-dress the most rugged land. The "Earlo" Spinner-Blower has been designed for easy attachment to your wide-gauge "Oliver" OC-3 . . . there's no labour needed other than the tractor operator . . . and it gives faultless service at any angle, in any position, year in and year out!





COUPLED TO YOUR "OLIVER" TRACTOR IN SECONDS!

Just a few seconds and the "Earlo" is securely coupled to your "Oliver" Tractor—it's as quick as that because this top-dresser has been specially made for "Oliver" Tractor use. The hoppers carry 15 cwt. of lime which can be spun, spread or blown to suit individual and local conditions—a great asset to every farmer!

Sole N.Z. Distributors:

FREDERIC W. SMITH LTD.

8-12 The Terrace,
Wellington.

144 Carlyle Street,
Christchurch.

OLIVER AUTHORIZED SALES SERVICE

Select the right equipment for fast, easy

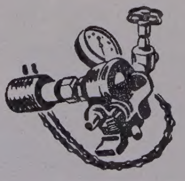
low-cost spraying

from the complete LO-VOL range!

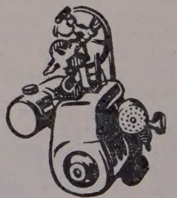
WEEDONE SPRAY BOOMS are available from stock in sizes 8ft. 6in., and 12ft. straight, 12ft. and 20ft. articulated, fitted with MONARCH type American design Lo-Vol nozzles. To ensure trouble-free operation, booms are crated for delivery with sediment trapping inserts carefully welded, nozzles, ample length of hose (plastic or spray-resisting rubber) hose connectors and clip and foot strainer. Your WEEDONE Service Representative will advise you on the type of rig you need, how to fit, calibrate and adjust. Enquire, too, about the latest Lo-Vol development . . . the new 200 gallon self-contained Trailer Unit which sprays 15 acres per hour from a 24ft. articulating boom. Ideal for large-scale, low cost spraying!

WEEDONE '57'
Volatile and Non-volatile control weeds in pastures. WEEDONE SPECIAL 2,4,5-T Volatile and Non-volatile control Blackberry, Gorse and Briar. WEEDONE STANDARD controls weeds in lawns, tennis courts, paths. TULOXONE '30' controls weeds in crops. WEEDAR '77' controls hard to kill weeds in Cereal crops. WEEDONE T.C.A. controls grass weeds.

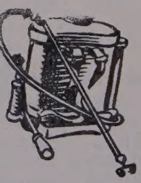
2 TYPES OF TRACTOR P.T.O. UNITS
The units are designed for power take-off operation from all tractors. Choose from models 20 and 21.



ENGINE POWERED PORTABLE UNITS
Models 59 and 62 are self-contained pumping units powered with 4 stroke engines. Ideal for use from truck trays or tractors. Model 60 is a 'pump and platform' unit and can be mounted with your own utility motor.



KNAPSACK SPRAYING PLUS FULL RANGE OF HAND EQUIPMENT
'Four Oaks' and 'Dron-wal' Knapsacks are ideal for smaller weed spraying operations on roadsides, driveways, lawns etc. A complete range of hand wands and interchangeable nozzle equipment also available.



GET FULL FACTS! SEE YOUR WEEDONE SERVICE DISTRIBUTOR.

ENGINEERED FOR NEW ZEALAND CONDITIONS BY THE WEEDONE SERVICE

position has been studied in the laboratory by soil analyses carried out in investigational work. The method of analysis does not lend itself to rapid tests suitable for advisory work. Such tests overseas are based on the use of the dye "titan yellow" or "thiazol yellow". The method has been intensively studied at the Rukuhia laboratories and found not sufficiently reliable, unless the magnesium is itself first isolated, a tedious process.

Manganese

As pointed out under soil reaction, the availability of soil manganese is greatly dependent on pH. This influence of pH is reflected in "exchangeable" manganese figures, but not in results of Morgan's test. Overseas research has pointed to the exchangeable manganese plus that "readily reducible" as giving a measure of the amount available for plant uptake. The method is used at this laboratory in special cases, but is not carried out as a routine test on account of the time factor.

Copper

Certain responses of horticultural crops to copper sulphate have been reported in New Zealand, and one of pasture on peat land. Low copper levels have become evident notably through stock trouble. I. J. Cunningham, Superintendent, Department of Agriculture Animal Research Station, Wallaceville, has distinguished a simple copper deficiency due to low copper levels in the pasture, and a complicated one due to a combination of low or medium copper and molybdenum excess. Affected areas have been defined both by pasture analyses at Wallaceville and by the use of a bio-assay method by the Soil Bureau. In the latter the mould *Aspergillus niger*, grown on a prepared soil culture, is used as the indicator. The method has proved useful but is not quick. Copper deficiency occurs largely on peats and on sand-derived soils.

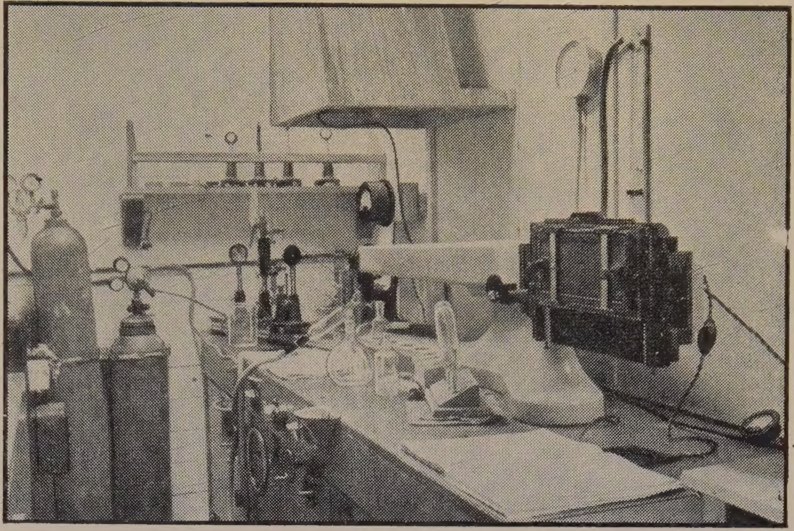
The tests suggested in the Morgan Soil Testing System have been used for indicating injurious concentrations of copper due to spray residues, rather than deficiencies.

Zinc

New Zealand instances of response to this element are so far limited to certain cases of fruit trees, one of pasture on a coastal sand, and some pot experimental results also on sandy soils. A wider investigation of the zinc status of soils, more particularly those of sandy texture, is warranted. A fairly rapid and specific means of determining zinc is available; that is, step 3 in the soil testing process should present no difficulty. Steps 2 and 4, the selection of an extractant and interpretation of results, remain for investigation.

Boron

Boron deficiency is common in New Zealand. Visual symptoms in crops are well recognised and these give a guide to the soils affected. The amount of boron extractable from the soil with boiling water is widely recognised as useful in diagnosing deficiencies. The determination is not rapid. The method has been used to a considerable extent in investigational work, but no large-scale application to soils under field crops, lucerne, or pasture has been attempted in New Zealand. Morgan suggested his quick test as a preliminary to the more precise laboratory determination, which would be applied in the event of a negative result.


A corner of the spectrographic laboratory at the Galloway Laboratory, Hamilton.

Iron

Iron is in ample supply in all soils. It may be present in an unfavourable and toxic form under waterlogged conditions. Deficiencies can be induced through over-liming and thus rendering the iron unavailable or hindering its utilisation within the plant. Under such conditions application of iron salts to the soil is of no avail.

Cobalt

Cobalt deficiency affects animal health. Responses in pastures are not known.

Acutely affected regions are well defined. Soil analyses, pasture analyses, and analyses of animal livers have all been correlated against the incidence of "bush sickness", the last-named proving perhaps the most reliable. It is possible that soil tests more critical than those used to date in New Zealand could be of use in indicating borderline areas where recognisable animal symptoms do not develop. An extraction with 2½ per cent. acetic acid has been used in England. Any test would need a critical and large-scale comparison against experiments with stock before it could be confidently adopted in New Zealand.

Molybdenum

Molybdenum, the latest element to become recognised as essential, is deficient in parts of New Zealand, and has aroused wide interest both on account of the minute amounts needed and the extraordinary increases in growth produced through its application to molybdenum-deficient areas. Molybdenum work conducted from the Rukuhia Soil Research Station will serve to illustrate the course of development of a soil test.

1. Intensive research into a disease of cauliflowers common in parts of New Zealand led to its identification as a molybdenum deficiency.

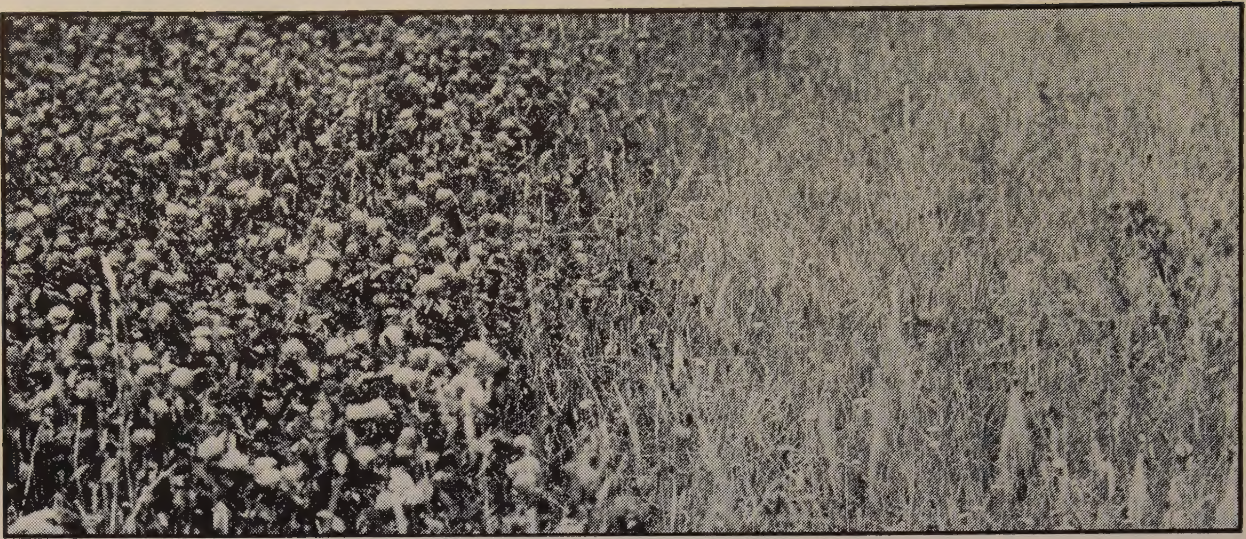
2. Field trials on permanent pasture were laid down and a response obtained on a North Auckland soil. The total molybdenum content of this soil was higher than that of any other New Zealand soil in which molybdenum had been determined. Total molybdenum content was evidently no guide to possible deficiencies and a test for availability was sought.

3. Suitable extractants were worked out on a theoretical basis and applied to a range of soils of known molybdenum response from South Australia. That placing them in approximately the correct response order was selected.

4. Results from application of this soil test indicated further possibly deficient areas. On this and other evidence, field trials were laid down and responses obtained in Southland, the Taieri foothills (including Invermay), and South Auckland. A tentative response level of 0.10 p.p.m. was put forward.

5. Many hundred field trials, mainly observational, and extending over most of New Zealand were then laid down by the Extension Division, Department of Agriculture, soil tests being carried out on samples drawn from each area. Correlation of field response and soil test results showed that the critical molybdenum response level varied with pH, ranging from 0.20 p.p.m. at pH 5 to 0.05 p.p.m. at pH 6.5.

6. In view of the danger to livestock of pastures containing more than about 10 p.p.m. of molybdenum (or lower where copper is deficient), analyses were carried out on pasture samples from selected trials as the experimental programme developed. It was early found that the high rate of 2½lb. of sodium molybdate per acre used in the initial pasture experiment, and which produced a harmful level of molybdenum in the herbage, could be diminished to 2½oz. per acre without loss of effect. This smaller rate raised the herbage molybdenum only slightly in those cases studied. Analyses of a



Robertson

The area on the left was treated with molybdenum superphosphate and the area on the right with superphosphate but no molybdenum. Both areas were sown at 1½cwt. per acre.

range of herbage species showed none to be a molybdenum accumulator at the pH levels at which the species were grown. Molybdenum uptake increases greatly at high pH values. Effect on herbage uptake of heavy liming in conjunction with molybdenum application was also studied in one trial. The increased molybdenum uptake was not of significance.

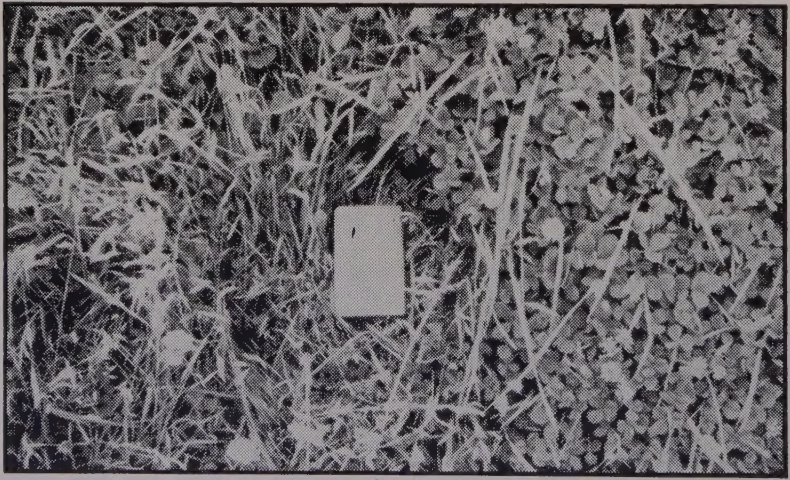
7. Laboratory research was conducted on the analytical method and a more rapid means of dealing with the interfering elements, titanium, vanadium, and chromium, was devised.

8. A proposition has been put forward and is under consideration for adding the test to the advisory service, the requirements of staff and apparatus being stated.

From the above description it will be appreciated that for the establishment of a sound advisory test more than the mere adoption of overseas methods, often only tentative and applied to a limited range of soils, is called for. The range between deficiency and toxic levels of the trace elements is often not particularly wide and molybdenum is not the only element whose indiscriminate application is undesirable.

An overseas authority, R. H. Bray (1), Professor of Soil Fertility at the Illinois Agricultural Experiment Station, may be quoted:—

> Not enough is known about how to extract the available form of the minor nutrients to warrant recommendation of any one extracting solution for making general soil-test correlations. This does not mean that some of the extracting solutions already in use cannot be employed for special local situations, especially where a spectrograph is available for measuring the nutrient in the extract. Often an extracting solution may be inferior for general use, yet may be useful for a special, local situation. For example, Morgan's "Universal" solution, used by Peech and English and by other investigators to extract the available phosphorus in soils, has been found useful for very limited correlations for some soils in the eastern part of the country. On the other hand, it has been shown to extract virtually no phosphorus from the rich soils of the corn belt not responding to phosphorus. Such a solution can be useful for a limited correlation, yet its recommendation generally for soil testing would be dangerous.



Right—A marked pasture response to superphosphate at 3cwt. per acre. Left—Plot received no topdressing. The area is a coastal sand flat near Bulls.

That interpretations worked out for Connecticut cannot be used extensively elsewhere is stated in the latest bulletin on the Morgan Soil Testing System (2).

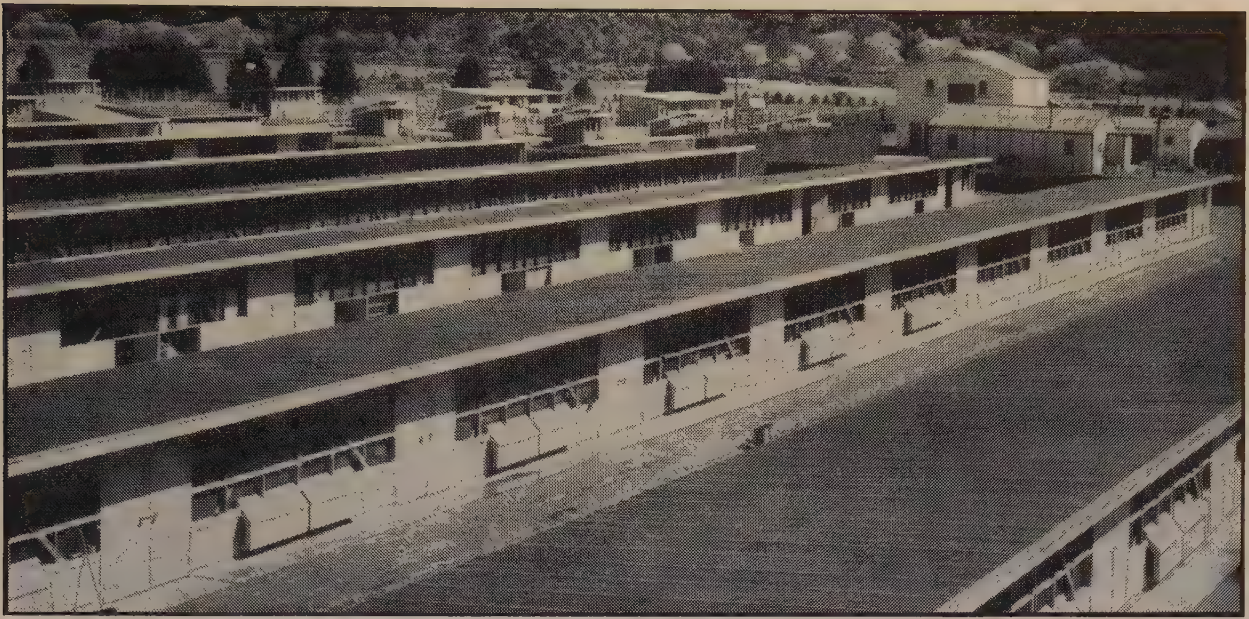
Particularly with trace elements, the approach most likely to yield returns is that of the Soil Bureau in distinguishing suites of soils derived from a common parent material, and therefore initially similarly endowed. They can ascertain whether the whole suite is likely to be deficient, and, if not, at what stage of development deficiencies are likely to occur. From their survey maps areas likely to be affected can then be traced out. As with Rukuhia Soil Research Station they are faced with the difficult matter of determining "availability" and have their own approach to the problem through *Aspergillus* assays and indicator plant analyses. The latter may well prove fruitful. The progress of such research is necessarily gradual if it is to be thorough. The Rukuhia Soil Research Station has been engaged on trace element work in connection with specific problems since its inception, but that is a different matter from supplying soil tests for general application on a wide scale.

It is understandable that with trace elements "in the air" farmers are impatient to have soil tests for trace as well as major elements at their disposal. From the present article it is hoped they will realise that work is being carried out, but that "Hasten slowly" is perhaps a wise motto.

References

(1) Diagnostic Techniques for Soils and Crops. The American Potash Institute, 1948. Pp. 81-82.

(2) The Morgan Soil Testing System, Bulletin 541, Connecticut Agricultural Experiment Station. May 1950. P. 47.



Feeding Synthetic Vitamin A to Laying Pullets

TOWARD the end of 1951 the Department of Agriculture learnt that supplies of synthetic vitamin A in powder form were available and likely to be imported into New Zealand for use in poultry feeding. Inquiries and a search of current literature failed to reveal any information of field trials with synthetic vitamin A for feeding to laying birds. The question then arose whether vitamin A in synthetic form would be an efficient source of supply of vitamin A for poultry. As there was no definite information on this point, it was considered desirable to conduct a feeding trial to test this product under field conditions before it came into use commercially in the manufacture of laying mashes. A feeding trial to test the efficiency of synthetic vitamin A was started in February 1952 at the Poultry Demonstration Plant, Upper Hutt, and the results obtained in this trial are discussed in this article by F. C. Bobby, Superintendent, Poultry Industry, Department of Agriculture, Wellington, J. J. Thompson, Veterinary Research Officer (Poultry), Department of Agriculture, Wellington, and W. R. Belworthy, Technician at the Poultry Demonstration Plant.

THE object of this feeding trial was to ascertain whether the synthetic vitamin A in powder form now being marketed is a satisfactory source of vitamin A for the maintenance of health and production in laying pullets. In planning the trial it was necessary to feed a fish liver oil of known vitamins A and D content to a control pen as a means of establishing a level of health and production against which the results from the other pens could be measured. On the other hand the trial was not planned to make a direct comparison of the relative efficiencies of natural and synthetic forms of vitamin A.

Claims made for the use of synthetic vitamin A have stimulated the interest of poultry producers and mash manufacturers. These include: (a) that as a powder synthetic vitamin A can be incorporated in a poultry mash both more easily and more evenly than a fish oil; (b) that the product is of uniform quality and of excellent stability, and (c) that it is low in cost per unit of vitamin A. No attempt has been made to prove or disprove these claims.

The synthetic vitamin A used in this trial is a product developed by Hoffman-La Roche and Company Limited of Basle, Switzerland, and is described as a vitamin A pre-mix powder produced on the basis of synthetic vitamin A-palmitate. The powder is in a highly concentrated form, being available at present with a concentration of 50,000 international units of vitamin A per gramme, added to which is synthetic vitamin D_3 in the proportions of 10 to 1 vitamins A to D. These vitamins are present in fish liver oils in similar proportions. Only small quantities of this highly concentrated vitamin product are required for mixing in poultry mashes; consequently it is desirable to use a "carrier" for this powder to form a more bulky pre-mix, which then can be more easily distributed through a mixture of meals. By this method even distribution can be achieved under practical conditions with normal dry-mash mixing equipment.

Basis of Trial

Started on 14 February 1952, the trial was continued for 11 periods of 28 days or a total of 44 weeks. Australorp-White Leghorn crossbred pullets were used, each pen containing 50 pullets selected on a random-sample basis. The birds were housed intensively, having no access to outside grass runs. All pullets were dewormed with carbon tetrachloride before being placed in their pens. Three pens of birds were used and fed as follows:—

Pen 1: Basic ration plus synthetic vitamins A and D.

Pen 2: Similar to Pen 1.

Pen 3 (control): Basic ration plus fish liver oil containing vitamins A and D.

No green food was fed to any of the pens during the trial.

Basic Ration

The basic ration consisted of laying mash and grain, with oyster shell and metal grit available at all times. The mash was fed dry in hoppers open to the birds all day and the grain was scattered in the litter twice daily, in early morning and late afternoon. The grain was fed at the rate of approximately 2oz. per bird per day. The laying mash and grain mixture were constituted as follows:—

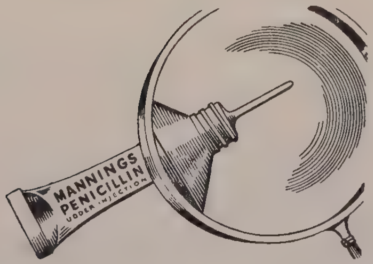
Mash	lb.	Grain	lb.
Bran	22	Wheat	71
Pollard	20	Barley	15
Wheat meal ..	24	Maize	7
Ground oats ..	7	Oats	7
Maize meal ..	10		
Meat meal* ..	15		100
Common salt ..	1		
Lime	1	* 60 per cent. protein	
	100		

HEADING PHOTOGRAPH: Part of the Department of Agriculture's Poultry Demonstration Plant at Upper Hutt, where the trials with synthetic vitamin A were carried out.

MANNINGS

PENICILLIN

With the new
thin, smooth nozzle


MANNINGS
PENICILLIN
UDDER INJECTION

MANNINGS

LONG-ACTING PROCAINE
PENICILLIN

3 STRENGTHS

(Normal and stronger 50,000
and 100,000 units per tube)

**OBTAINABLE THROUGHOUT
NEW ZEALAND**

Mannings Ltd., Hamilton

M11.

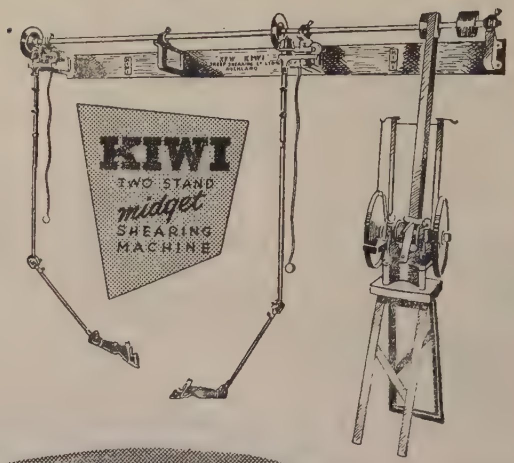
Mannings
PENICILLIN
INJECTION

---

a **GIANT** *in performance.*

Fitted with ball bearings and patented cam clutch in-and-out gearing.

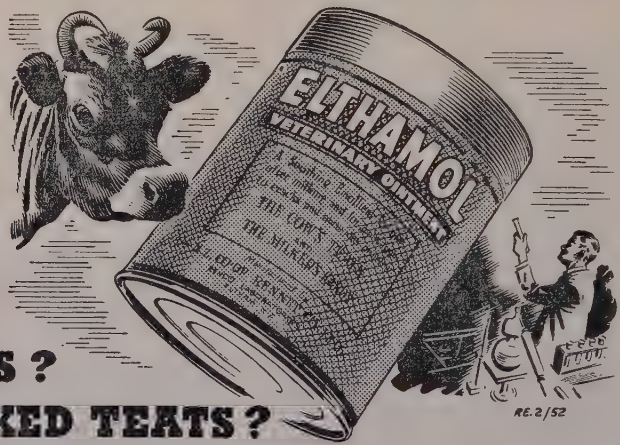
ALSO
AVAILABLE
"Portable"
"Electric"
"Midget"
and
"Tractor"
models to suit
your
requirements


NEW KIWI
KIWI
TWO STAND
midget
SHEARING
MACHINE

KIWI
SHEEP SHEARING MACHINES

Enquire NOW through your stock and station agent or direct to us.

NEW KIWI SHEARING MACHINE CO. LTD. 90 FEDERAL ST. AUCKLAND


ELTHAMOL
VETERINARY OINTMENT
THE COW'S TONIC
THE MILKER'S FRIEND
RE.2/52

CHAPS ?

CRACKED TEATS ?

BRUISED UDDERS ? . . . .

Then apply ELTHAMOL VETERINARY Ointment smartly. Made by the N.Z. Co-op Rennet Co. Ltd., of Eltham, ELTHAMOL has proved again and again that a combination of strict laboratory control in manufacture, coupled with a background of practical and personal experience by farmer directors, can produce an all-round veterinary ointment of surpassing excellence. Sold in 2, 10 and 36lb. tins. It's most economical to buy the larger sizes.

Obtainable from all Stock and Station Agents and Dairy Factories.

ELTHAMOL
VETERINARY OINTMENT

Made exclusively by
THE N.Z. CO-OP
RENNET CO. LTD.
Bridge Street, Eltham,

Into every 100lb. of mash fed to Pen 3 (control) was mixed ¾ pint of a fish liver oil containing 2000 international units per gramme of vitamin A and 200 units of vitamin D. This supplied 3500 units of vitamin A in each 1lb. of total food—mash and grain—consumed by the birds, a quantity in excess of the number of units recommended for laying birds by the National Research Council. The amount of oil used, however, is similar to that normally recommended to poultry producers by the Department.

Pens 1 and 2 received mash to which 10.13 grammes of synthetic vitamin A powder per 100lb. had been added. The latter was first made into a pre-mix with 1lb. of maize cornflour before being mixed into the mash. This gave a similar vitamin A and D level to that established in Pen 3 (control) with fish liver oil. At the time this experiment was started the Department was supplied with a synthetic vitamin A powder containing 70,000 international units of vitamin A per gramme and not 50,000 units as in the powder now being marketed. Thus the quantity used, 10.13 grammes per 100lb. of mash, is based on the more highly concentrated powder.

No greenfeed was supplied to any of the pens, as this could have upset the vitamin levels established. It was assumed that the pullets used in the trial started with a normal reserve of vitamin A in their bodies, as they were drawn from birds running on grass under free range.

Measuring Results of Trial

Data were collected from each of the three pens as follows:—

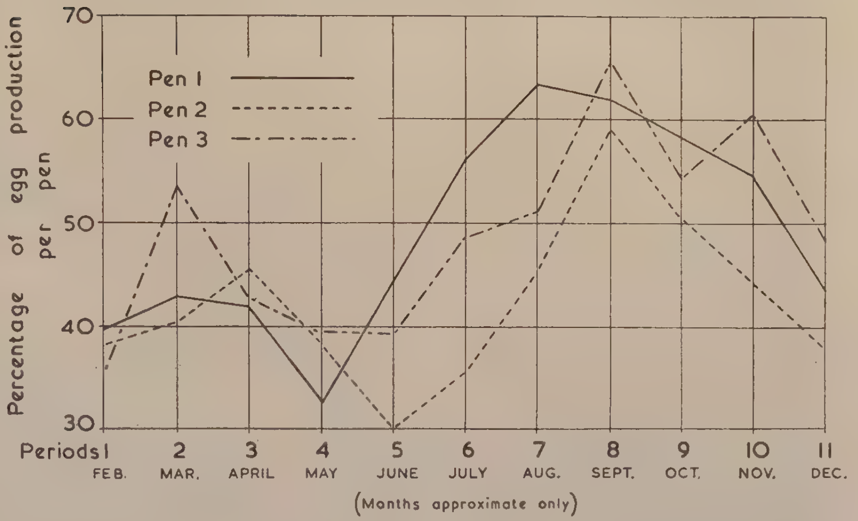
Egg production—as a main basis for comparison between Pens 1 and 2 and Pen 3 (control).

Food consumption—as a means of checking that food consumption was normal.

Mortality—all birds which died were sent to the Department of Agriculture's Animal Research Station, Wallaceville, for post-mortem examination, particular attention being paid to any lesions associated with vitamin A; no culling was done in any of the three pens.

Reserve of vitamin A in the livers of the pullets at the completion of the trial.

Egg production was selected as a basis of comparison between Pens 1 and 2 and Pen 3 (control), as this basis had proved satisfactory in similar feeding trials conducted at the Poultry Demonstration Plant in 1950 and 1951. In 1950 a trial demonstrated clearly that a ration grossly deficient in vitamin A when fed to laying pullets resulted in a spectacular drop in egg production after the trial had been in progress for 9 to 10 weeks. Further it was shown birds receiving a ration considered to be below satisfactory level for vitamin A laid fewer eggs than birds receiving an adequate intake of the vitamin. This result was later confirmed when the trial was repeated in 1951. Consequently it was reasonable to assume that if the birds receiving synthetic vitamin A were unable to make satisfactory use of this substance, this would be reflected in poorer egg production than that from a standard-fed control pen. This was considered to be a more sensitive method of measuring results than that of checking for gross lesions of avitaminosis A.



Egg Production

The production obtained from each pen is given on the graph above expressed as average percentage egg production per pen for each of the 11 periods. In addition the average number of eggs per bird for each period is set out in the table below. Both the graph and the table show clearly the effect on egg production in all three pens of the pullets going into a neck moult during winter (Periods 4 and 5). As the three pens show a similar drop in production at this time, it has no significance in the trial.

Pen 1 gave total average production per bird similar to Pen 3 (control) and, as the graph shows, rather more consistent production. Pen 2 on the other hand gave lower production in all periods except one of the trial. The picture as a whole, however, was that birds receiving synthetic vitamin A gave production similar to that given by the control pen.

Food Consumption

The total food consumed per bird for the 44 weeks for each pen was as follows: Pen 1, 85.6lb.; Pen 2, 85.7lb.; and Pen 3 (control), 91.0lb.

AVERAGE NUMBER OF EGGS LAID PER BIRD PER PERIOD

	Periods											Total
	1	2	3	4	5	6	7	8	9	10	11	
Pen 1	10.89	12.04	11.86	9.18	12.52	15.76	17.87	17.47	16.31	15.37	11.34	150.61
Pen 2	10.73	11.36	12.87	10.75	8.26	10.70	12.79	16.59	14.13	12.43	9.89	130.50
Pen 3 (control)	9.96	14.93	12.28	11.09	10.96	13.70	14.31	18.42	15.24	17.02	12.54	150.45

Mortality

The losses recorded from the three pens were: Pen 1, 7 birds; Pen 2, 5 birds; and Pen 3 (control), 6 birds. The post-mortem examinations carried out on these birds did not reveal any lesion indicative of avitaminosis A.

Examination of Livers for Vitamin A

At the conclusion of the trial 20 pullets taken at random from each pen were killed, plucked, and eviscerated. The livers of the birds from each pen were kept separately in jars and passed to the Animal Research Station, Wallaceville, where two estimations of the vitamin A content of each jar of livers were made. The method adopted and the results obtained were as follows:—

First Estimation

The livers from each of the three jars were treated in a similar manner. A small portion of liver tissue was cut from the edge of each piece, the size of each portion taken being approximately proportional to the size of the piece of liver from which it was cut. The weights of the samples so taken were: Pen 1, 38 gm.; Pen 2, 33 gm.; Pen 3, 40 gm.

Each sample was then put through a fine mincing machine and the resultant material stirred thoroughly; 5 gm. of each was used in the vitamin A determination, with the following results:—

	Vitamin A content International units per gramme
Pen 1	912
Pen 2	848
Pen 3	1072

Second Estimation

The portions of livers from each pen remaining after the samples had been cut were minced and well stirred: 5 gm. were taken from each part of this material and the following estimations of vitamin A determined:—

	Vitamin A content International units per gramme
Pen 1	896
Pen 2	720
Pen 3	1008

The explanation suggested for the consistently lower figures in each pen in the second estimation is that in the latter more fibrous connective tissue at the centre of each liver was included and in consequence lower assay figures might be expected. Though the figures obtained for Pens 1 and 2 are lower than those for Pen 3, all the groups examined contained a higher vitamin A content than was expected and is normal for laying birds.

Conclusions

Though the egg production for the pullets in this trial was lower than may be expected normally, this was largely attributable to the neck moulting during winter and was similar in this respect for all three pens. Although Pen 2 gave inferior egg production figures compared with the control pen, those for Pen 1 and the control pen were similar. If these results are coupled with the fact that no lesions of avitaminosis A were found in any of the dead birds examined and with results obtained from the estimations of the vitamin A in the livers of the birds from the three pens at the conclusion of the trial, it is reasonable to conclude that the synthetic vitamin A used was a satisfactory source of vitamin A for these laying birds.

Concern is felt, however, about the possible sale of this highly concentrated vitamin product in its present form direct to poultry producers. Small quantities only of this powder, accurately weighed out, are required to incorporate the quantity of vitamin A necessary for laying mashes. Careless handling of the product and use of amounts in excess of the strict requirements would not only lead to waste and unnecessary expense, but might become detrimental to the birds so fed.

Poultry producers generally have not the equipment to weigh out a powder in small quantities measured in grammes and it is hoped that this product will not be used by either producer or mash manufacturer who has not a proper appreciation of the correct method in which to use it.

◆

Silage Making at Waimate West Demonstration Farm

It is regretted that on page 99 of the August issue of the "Journal" no acknowledgment was made for the assistance given by the makers of the Rosswood buckrake illustrated in three of the photographs reproduced.

◆

Control of Californian Thistle in Grass Seed Crops

WITH modern weedkilling methods Californian thistle is controlled in grass seed crops without damage to the grass seed. All grass crops are susceptible to hormone weedkiller damage at only two stages of growth. The first stage is when the crops are in the first seed leaf after germinating. Damage can occur at this stage with oil-based esters of 2,4-D. After tillering the crops are not damaged by hormone weedkillers until flower head formation. Once the seed head has formed the crop is again resistant to hormone weedkillers. Germination tests have shown that provided the crop is not treated when the flowers and seed are forming, no loss in seed viability occurs through the use of hormone weedkillers.

Established stands of Californian thistle require more than one application of hormone weedkillers for eradication. The first application should be made when the thistle is in the rosette stage. The most suitable preparations for application at the rosette stage are the water-based hormones of M.C.P. and 2,4-D (salt and amine salts). These preparations should be applied at 1 to 1½lb. of acid equivalent per acre in sufficient water to give a thorough coverage of all the foliage, particularly the basal leaves. Not less than 20 to 30 gallons of water per acre are recommended. If the application is left later and the Californian thistle reaches the flower head formation, the best control will be obtained if the ester preparations of 2,4-D are used. Repeat applications can be applied either the following autumn when the thistles are in the rosette stage after removal of the grass seed crop or the following spring.

In pastures old enough for seed crop production the usual practice is to hard graze, spray, and then shut up the area for a seed crop. This should take place before the initiation of the flower stalk. For those crops that are harvested in the first year after sowing down, the most suitable hormone preparations are the water-based salts of M.C.P., as the Californian thistle plants are usually at the rosette stage at the time of shutting up and less clover damage results from the use of these preparations. For crops that are harvested the second year onward, if a check to the clovers would be an advantage, spraying should be done with an ester preparation of 2,4-D before grazing. Grazing should then take place about a week to 10 days after the hormone treatment. This method would reduce clover density in the sward.

Surviving patches of Californian thistle or plants in unsprayed areas may be depressed a few days before harvest by chemical desiccants. Such depression of Californian thistle by chemical desiccants allows a clean harvest. Chemicals suitable for this purpose are "Atlacide" and mixtures of phenols and diesel fuel oil or creosote. Application of chemical desiccants has no adverse effect on seed germination. "Atlacide" is applied at 15 to 30lb. per acre and the phenol mixtures at 1 to 5 gallons per acre in sufficient water to give adequate cover.

—L. J. MATTHEWS,
Weeds Research Officer,
Department of Agriculture,
Wellington

Meteorological Records for August

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	53.1	+ 2.1	67.0	34.2	13.82	27	+ 6.99	3.67	4	110.5
Auckland	160	53.8	+ 1.6	64.2	40.6	8.83	18	+ 4.41	1.56	25	126.3
Tauranga	10	50.3	+ 0.6	63.7	32.1	6.64	23	+ 1.89	2.11	13	140.9
Ruakura	131	48.4	+ 0.6	62.6	28.2	4.35	17	+ 0.26	0.80	17	124.9
Rotorua	969	46.9	+ 0.4	59.0	30.1	6.67	17	+ 1.77	2.71	13	109.5
Gisborne	12	48.8	— 0.9	65.5	30.8	1.86	11	— 2.00	0.63	13	170.4
New Plymouth ..	160	50.8	+ 1.2	61.5	34.8	7.81	20	+ 2.06	1.63	3	143.5
Napier	5	49.0	— 0.1	66.7	30.8	0.94	10	— 1.99	0.36	17	173.6
Karioi	2125	42.4	+ 0.4	59.0	24.5	2.00	12	— 2.21	0.40	18	
Wanganui	72	49.7	+ 0.6	64.5	31.9	1.64	13	— 1.31	0.56	17	144.3
Palmerston North .	110	48.9	+ 1.2	63.8	29.8	1.63	15	— 1.12	0.46	17	125.1
Waingawa	340	46.8	+ 0.9	63.3	27.0	2.51	11	— 1.67	0.80	13	155.1
Wellington	415	49.6	+ 2.0	61.4	34.4	2.78	13	— 1.87	0.93	13	136.4
Nelson airfield ..	5	46.6	+ 1.8	59.6	27.0	5.85	16	+ 2.71	1.76	3	134.5
Blenheim	12	47.8	+ 1.0	62.7	28.4	3.48	12	+ 1.15	1.06	13	157.0
Hokitika	15	48.0	+ 3.1	63.2	30.9	9.53	20	+ 0.49	2.00	7	90.9
Hanmer	1270	43.0	+ 1.6	62.0	24.0	7.06	10	+ 3.48	1.98	13	123.3
Christchurch ..	22	45.7	+ 1.4	68.2	28.9	3.67	9	+ 1.62	1.41	13	114.4
Ashburton	323	45.0	+ 1.3	67.4	26.8	3.23	12	+ 0.91	0.93	13	111.3
Timaru	56	43.8	+ 0.0	64.6	27.8	2.94	9	+ 1.48	1.12	13	102.0
Alexandra	520	41.8	+ 0.4	63.3	25.8	0.64	6	+ 0.01	0.34	17	110.2
Taieri	80	44.0	+ 0.3	67.8	25.7	1.72	12	— 0.02	0.50	14	100.3
Invercargill airfield	0	43.0	+ 0.0	62.8	25.7	2.37	12	— 0.57	0.58	1	115.6

HEADING PHOTOGRAPH: Three of a group of four sprayers which have been fitted with devices to protect the operators from poisonous spray materials. Green and Hahn photo.

Protecting Sprayer Operators from Poisoning

WITH the tremendous advances in recent years in weed and insect control, a number of new weedicides and insecticides are now on the market and are being increasingly used because of their greater efficiency. However, among them are some that are potentially dangerous to humans unless adequate measures are taken by those using these chemicals to avoid contamination by them. H. Jacks in an article "Health Aspects of Plant Therapeutants", in the July 1952 issue of the "Journal", dealt with the hazards to health associated with the use of many new preparations, described their toxic effects, symptoms of poisoning, and treatment for affected persons, and offered sound recommendations on the use of protective clothing for operators handling such materials. This article by C. J. Crosbie, Machinery Instructor, Department of Agriculture, Christchurch, describes the equipment and clothing that are desirable for the protection of operators using these materials in the field and discusses precautions necessary with four groups of chemicals used widely in agriculture—phenols, D.D.T. and B.H.C., sulphuric acid, and T.C.A.

PHENOLS

MATERIALS included under the heading of phenols are based on P.C.P., D.N.O.C., and D.N.B.P. Preparations of P.C.P. and D.N.O.C., particularly new derivatives such as the diethylamine salt of D.N.O.C., are far less poisonous than preparations of D.N.B.P. Preparations of D.N.B.P based in oil are particularly poisonous to humans and must be handled with caution, especially when temperatures are high. Their use should be discontinued when the temperature rises above 80 degrees F.

All preparations of phenols can be absorbed into the body through the skin, so care must be taken to avoid splashes on the skin. Any accidental splashes should be washed off immediately. Fine spray particles from low-volume or high-pressure booms and dry particles of the weedicide that result from spray droplets drying out as they float in the air can be inhaled and are dangerous to the operator. Smoking in the field while such chemicals are being used is also dangerous because of contamination of the cigarettes by spray-covered fingers or gloves.

Protection

To protect the operator handling such chemicals it is necessary to provide a barrier between him and the chemical so that contamination is prevented.

Phenolic Poisoning

OPERATORS who notice the symptoms of insomnia, sweating, lassitude, thirst, nausea, and loss of weight while they are using P.C.P., D.N.O.C., or D.N.B.P. preparations are strongly recommended to seek urgent medical attention and not to resume work with these chemicals unless a doctor's permission has first been obtained. These are the first symptoms of phenolic poisoning.

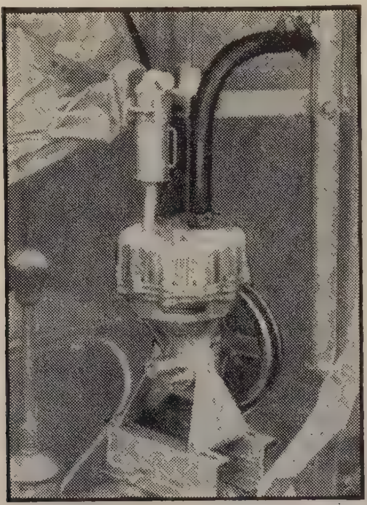
Blocked nozzles on sprayers should never be cleaned by putting them to the lips and blowing through them.

For the operator whose sole work is the preparation of the spray mix the wearing of white overalls, gumboots, rubber gloves, and an eye shield will be sufficient to guard against splashes while he handles the concentrated weedicide. The cans used for measuring the concentrate into the spray tank should be fitted with an anti-splash device and for this purpose a watering can with the rose removed is very useful.

The sprayer operator who drives the tractor in the field needs protection from spray droplets and dry particles in the air. In England gas-proof, air-conditioned tractor cabs have been developed to give this necessary protection. They are not in use yet in New Zealand, but a commercial firm of spraying contractors with headquarters in Christchurch and operating over a wide area of Canterbury has developed a protective device for tractor drivers which has proved successful in the field, which has passed vigorous tests by chemists of the Dominion Laboratory, and which is under consideration by the Division of Occupational Health of the Department of Health.

Air Wash Mask

The sprayer operator wears white overalls buttoned up to the neck,



A small air compressor which is used to deliver air through a filter mounted above it to an air wash mask. The compressor delivers about 3 cub. ft. of air per minute at atmospheric pressure and is belt driven from the power take-off shaft of the tractor.

gumboots, and rubber gloves and is provided with an air wash mask to avoid inhalation of weedicide floating in the air. The air wash mask consists of a clear plastic face shield and white cloth hood completely enveloping the head and neck, and the free lower edge is tucked firmly inside the neck of the overalls. Air drawn from an intake pipe mounted on the tractor and extending 8ft. into the air is pumped by a small air compressor through a filter and rubber tubing to the operator and enters the mask over his head. The air is distributed across the top of the mask by a small metal tubing fitting and it is forced down by the incoming air and is expelled through the fabric of the mask on the operator's shoulders; in this way it prevents the entry of spray particles through the fabric.

REGISTRATION OF

DAIRY FACTORY MANAGERS

Intending applicants are hereby notified that applications for registration under the Dairy Factory Managers' Regulations should reach the Registrar, Dairy Factory Managers' Registration Board, c/o Department of Agriculture, P.O. Box 2298, Wellington, on or before 1 December 1953. Forms are available from the Registrar.

Attention is drawn to the fact that any application which is received by the Board after 1 December 1953, shall not, except in special circumstances, be considered by the Board until after 1 December 1954.

E. M. EDGECOMBE,
Registrar.

N.B.—*This notice refers to persons who are NOT AT PRESENT HOLDERS OF CERTIFICATES. Notice of renewal and renewal form will be posted to every registered manager by the Registrar.*

The compressor used is a small one readily available on the market for use with portable paint-spraying outfits and is capable of delivering about 3 cub. ft. of air per minute at atmospheric pressure. It is belt driven from the tractor's power take-off shaft. The filter is a small canister with a removable screw top that is filled with teased-out cotton wool. A screw control valve is fitted in the air line so that the rate of flow of air can be shut off or controlled, but in practice it has been noted that operators usually work with the full flow available. The air wash masks, though made in Australia, are available in New Zealand and the whole unit could be built up for approximately £30.

During the development of this protective unit field tests showed that the cloud of spray droplets suspended in the air about the spray boom did not rise more than about 4ft. from the ground (boom height approximately 18in.). With the intake end of the air pipe 8ft. above ground and after a lengthy period of work in the field, the cotton wool in the filter showed no discoloration from the deeply staining yellow weedicide used. If the cloud of spray particles rose above 4ft. with other machines that use a higher boom, it would be a simple matter to extend the air intake pipe. In the field the air wash masks did not fog up, were light and comfortable, and were found by the operators to be easy to wear.

Washing Facilities

A supply of water, a tin or bowl, and soap and towels should always be available for operators to wash themselves before meals. Separate facilities should be supplied for washing gloves and gumboots. There must be no eating or smoking while spraying is being done.

The air wash masks and overalls must be washed as soon as they show contamination with the spray material, or at intervals of not more than a week.

D.D.T. AND B.H.C.

D.D.T. and B.H.C. ("Gammexane" or lindane when it is 99 per cent. pure) are widely used in the field for the control of grass-grub and subterranean caterpillar. D.D.T. was used to treat more than 73,000 acres in the South Island last year.

D.D.T.

There is no absorption of D.D.T. through the skin and slight absorption through inhalation and ingestion when it is used in the dry dust form, as when mixed with a fertiliser. Solutions, however, especially those in oil, are readily absorbed and repeated exposure is dangerous. Ingestion of a dose of 1oz. of D.D.T. may be fatal, and the potential hazards of smaller doses taken over a period are considerable. Tests have shown that D.D.T. accumulates in the body when fed in small doses over a period and the rate of disappearance is slow. It is stored in the body fat and liver. Symptoms of D.D.T. poisoning usually begin with giddiness, nervous tension, tremors of the head and neck, and convulsive seizures, finally reaching a stage of depression and respiratory difficulties. Young people are more susceptible than adults. D.D.T. is a skin irritant, so that dermatitis can be contracted through working with it. Gloves or a barrier cream and ample washing will prevent this.

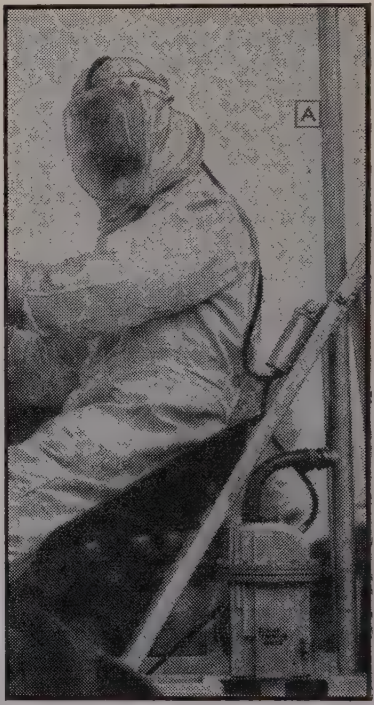
Case of Poisoning

In Canterbury this year a serious case of D.D.T. poisoning occurred in a young man helping his father to spread D.D.T.-superphosphate mixture. He was admitted to hospital and was under treatment there for 2 weeks. The D.D.T. being used was in dust form and was not a wet spray, which would be more dangerous.

Protection

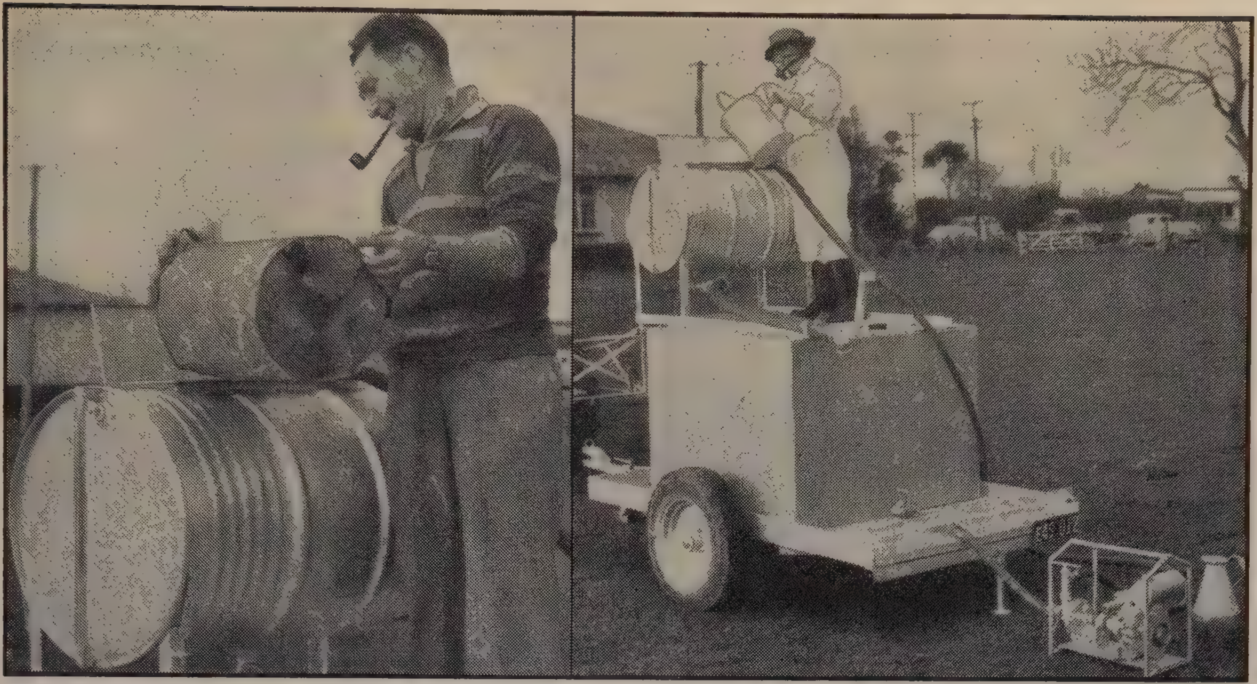
As D.D.T. in the dry form is not absorbed through the skin, the only protection needed for an operator is a nose and face mask, readily available on the market to combat dust nuisances. This applies particularly to young people assisting the operation.

If, however, D.D.T. is being used in the spray form, as for pastures or sheep sprays, the sprayer operators will need protective clothing, gumboots, rubber gloves, and a hood or air wash mask if fine spray particles are present in the air.



[*Green and Hahn*

The lower edge of the cloth hood of the air wash mask is fitted tightly inside the buttoned neck of the overalls so that the air supplied by the compressor is forced out through the cloth of the mask and thus prevents entry of spray material through the cloth. The air intake (A) is 8ft. above ground level.



[*Green and Hahn*

The incorrect (left) and correct (right) methods of making the spray mix. The operator on the left is smoking and is very likely to get splashes of spray on his face, chest, hands, and arms, as he is using an open drum to pour the concentrated weedicide into the mixing tank. The other operator wears protective clothing, gumboots, gloves, an eye shield, and a nose and mouth mask to protect himself from splashes and uses a watering can for the concentrate to reduce the risk of splashing. The Canterbury firm of spraying contractors using the machines illustrated in this article supply water for the sprayers from a mobile tanker. The water is pumped to the top mixing tank and the concentrate spray material is added to form the spray mix for the sprayer. It is fed by gravity through a large hose to the tank on the sprayer.

B.H.C.

B.H.C. is moderately absorbed through the skin, slightly absorbed when ingested, but not absorbed when inhaled. B.H.C. is a skin irritant, and toxicity on ingestion increases with repeated exposure, the fatal quantity being about a quarter to a half that for D.D.T. Young people are more susceptible than adults. Symptoms of B.H.C. poisoning are excitability and convulsions.

Protection

As B.H.C. is absorbed through the skin, the precautions necessary are protective clothing, gumboots, rubber gloves, and eye shields or face shields. Ample washing facilities need to be available and all operators must wash thoroughly before meals.

When D.D.T. and B.H.C. are used in conjunction in spray form, as in some types of sheep sprays for blowfly control, all precautions will be necessary and ample washing must take place before meals.

SULPHURIC ACID

Dilute solutions of sulphuric acid are used for weed control in onion crops in New Zealand and precautions in its use are necessary to prevent burning of the skin and especially of the eyes.

At mixing, the operator must wear protective clothing (preferably wool, as it resists to some extent the action of the acid), gumboots, rubber gloves, and an eye shield or face shield. When preparing the spray solution **always add acid to the water** and not water to acid.

If water is added to concentrated acid, the heat generated in the chemical reaction may be so great that it turns the water to steam and causes an explosion. The greatest danger, if the operation is performed correctly, is from splashes of acid as it is poured from the carboy. Pouring the acid down a rod will greatly reduce this danger.

Ample water supplies must be readily available for immediate copious washing in case the operator is splashed. If the eyes are affected, they should be washed well with water immediately and medical attention should be obtained as soon as possible.

The sprayer operator needs ample protective clothing to safeguard the body from spray particles in the air and must wear close-fitting cup goggles. A barrier cream will protect the face from the "pin pricking" action of the spray particles in the air.

Safeguarding Children

It is essential to destroy all empty containers which have held poisonous chemicals and to keep concentrated sprays stored under lock and key and away from children. The following tragic case illustrates how real is the danger to children:—

In January 1952 two children in Nelson picked up a bottle which had contained an organic phosphorus insecticide and which had been empty for a year, filled it with water, and had a drink. One died within 20 minutes and the other was seriously ill for some days.

This organic phosphorus insecticide is available on the market for use by home gardeners.

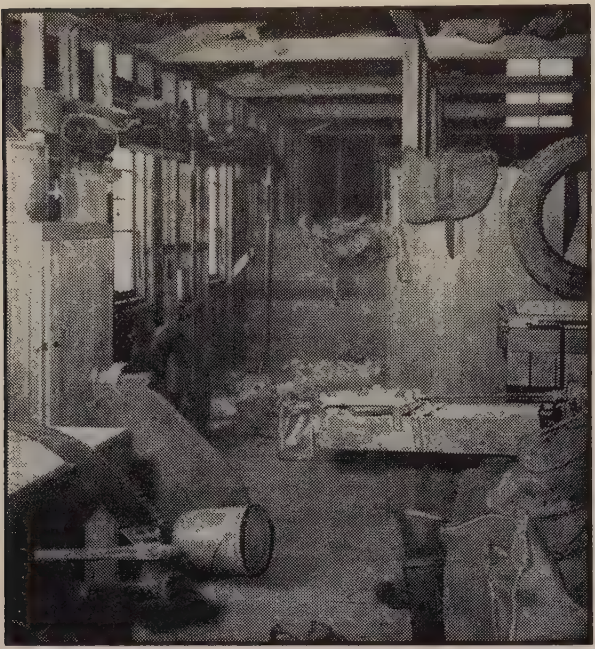
T.C.A.

T.C.A. under various trade names is now on the New Zealand market for the control of twitches and other weed grasses and will be commonly used. It can be used in powder form or in solution as a spray. It is caustic in its action on the skin and care must be taken to prevent splashes in the eyes. It is a strong irritant. Splashes on the skin should be washed off immediately; otherwise peeling may occur. If the eyes are affected, they should be washed out copiously with pure water and medical attention should be obtained.

Protective clothing, gumboots, rubber gloves, and cup goggles should be worn as for the application of sulphuric acid. Contaminated hands should be kept away from the face. A barrier cream on the face will assist if T.C.A. is being applied through a sprayer.

Care of Livestock during November

Contributed by the Animal Research Division



[*Campbell*

A dirty and untidy shearing shed such as that illustrated above can be a source of infection from such diseases as blood poisoning, tetanus, and caseous lymphadenitis after shearing.

SHEARING PREPARATIONS

PREPARATIONS for shearing should be made now. Attend to sheepyards and scrub out the woolshed. This will reduce trouble from such diseases as blood poisoning, tetanus, and caseous lymphadenitis ("lympho") after shearing. Check over all machinery to see all parts are in good working order. Dag all dirty sheep and shear hoggets, wethers, dry ewes, and rams. When culling sheep before shearing pay particular attention to teeth and udders and watch for dropped bellies. On fat lamb farms ewes are best shorn after one or two drafts of lambs are away.

DRY EWES

If dry ewes have not already been removed from the flock, they should be separated immediately. It is a good plan to shear them and, during shearing, they should be inspected carefully for udder abnormalities. All ewes whose udders were empty at lambing and ewes with diseased udders, damaged teats, very large teats, very small teats, or badly placed teats should be culled. Dry ewes with defective mouths and old ewes which did not have a lamb this year should also be culled. Dry ewes which are retained should not be allowed to get too fat during summer. If kept in hard store condition, they are more likely to hold when mated next autumn.

CONTROL OF FAT LAMB PASTURE

Pastures on which ewes and lambs are grazing should never be allowed to become rank. If pastures are getting too long, they can best be controlled by cattle. Yearling beef cattle soon become quiet and they can then be run with ewes and lambs even in small paddocks.

DIP RAMS EARLY

Rams should be dipped before they begin to flush, preferably before Christmas. Flushed rams sometimes scald after dipping.

HILL STATIONS

Where bidi-bidi comes away early, and is troublesome, ewes should be shorn toward the end of this month. Cull run cows not required for breeding. Brand calves and handle them as opportunity permits. In warmer districts put bulls out with the breeding herd. Where water is not laid on attention should be given to dams and springs so that water supplies will be plentiful during the hotter weather.

CARE OF PIGS

Dry sows should have access to good pasture, and in addition should receive from 2 to 4 gallons of milk per day, depending on their condition. They should be kept thriving, but should not be allowed to become too fat. Keep only as many of the spring litters for baconers as can be fed adequately. The remainder should be sold as porkers.

VACCINATION AGAINST CONTAGIOUS ABORTION

Vaccination has reduced the New Zealand average rate of abortion in dairy cows from about 5 per cent. to about 1 per cent. There are, however, still too many dairy farmers who do not have their calves vaccinated. Past freedom from abortion is no excuse for not vaccinating, as infection may be introduced into a herd at any time. Although vaccination does not start until January or February, application for vaccination should be made early, as Veterinarians and Inspectors of Stock have to plan their vaccination itineraries, and late applications make this very difficult.

GRAZING MANAGEMENT OF DAIRY PASTURES

During the season of maximum grass growth the problem is to control pastures at their most leafy, nutritious stage. This is best achieved by conserving all growth surplus to requirements as silage and hay. Later on in the season it is important to maintain sufficient pasture cover to ensure growth during the dry summer period. As grass growth declines the period which paddocks are spelled between grazing should be gradually increased and as much silage as the cows will clean up should be fed out.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during August 1953 with comparative figures for the same month of 1952, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

		Tons		Percentage
	Creamery	Whey	Total	Inc. or dec.
August 1953	9,428	118	9,546	—
August 1952	8,939	105	9,044	—
Increase or decrease ..	+489	+13	+502	+5.551

Butter in store at 31 August 1953 was 6,412 tons

CHEESE

		Tons		Percentage
	White	Coloured	Total	Inc. or dec.
August 1953	1,650	7	1,657	—
August 1952	1,343	—	1,343	—
Increase or decrease ..	+307	+7	+314	+23.384

Cheese in store at 31 August 1953 was 5,161 tons

If these figures are converted into butterfat equivalent, there is an increase of 6.669 per cent. in butterfat graded for August as compared with the corresponding month of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Pasture Management on Dairy Farms

Seasonal Notes by the Extension Division

LATE October-early November is a critical period in dairy farm pasture management and close attention should be given to the conservation of surplus feed as silage and the removal of rank growth from grazing pastures. Early ensiling results in a good aftermath, which usually carries on growth well into January, thus making a valuable contribution to milk-producing feed during dry weather.

TOPPING PASTURES

TOPPING of grazing pastures in November is essential in pasture management on dairy farms. At this time most grasses are tending to run to seed and there is a general slowing down of the rate of growth of the leafy portions of the plant together with an increase in fibre content. Cows in milk tend to neglect such fibrous growth in favour of more succulent herbage growing lower down in the sward. Break grazing gives much greater control over the animals' feeding habits and selective grazing can be reduced to a minimum without lowering the intake and subsequent production. Even so, it is not possible to clean up all the semi-mature growth, and if there is a sufficient number of dry stock they can be used as followers to graze the area quickly. The mower set up on its skids, adjusted to cut at a height of 4 to 5in. and with swath board removed offers a quick, easy, and efficient way of removing ungrazed herbage. Topping assists in maintaining a dense bottom to the sward, which in turn prevents undue surface evaporation in a dry spell, favours the production of leaf rather than stem, and ensures that no one species becomes dominant to the detriment of others.

—J. R. ADAMS

* * *

BUCKRAKE SILAGE

THE introduction of the buckrake does not entail a change in the principles underlying the making of good silage. The most important outcome of its use is that very much greater consolidation of the stacked material is possible. Where mature pasture is to be ensiled this is a definite advantage and has enabled good-quality maintenance silage to be made where formerly it would overheat. With young, succulent material, however, steps must be taken to offset the possibly too consolidating effect of the tractor to ensure that extremely sour silage does not result. Where under orthodox methods it was necessary to spell a day after the first day's stacking to allow sufficient rise in temperature, it may be necessary when the buckrake is used to spell 2 or even 3 days before putting in further material. It is also necessary to spell every second day during the course of building the remainder of the stack. So that there will not be unnecessary delay, it is wise to have two stacks under construction at the same time. The stack should be finished off with the most succulent material available and this, of course, should not be wilted. Freshly cut, immature pasture has approximately 10 per cent. more moisture than the resultant silage. Wilting of such material placed at the bottom of a stack is good practice, since it overcomes the tendency of such layers to be extremely sour and reduces the loss of valuable plant food carried away in the exudate.

COVERING SILAGE

Sealing should be begun immediately after completion of stacking. If it is delayed for two or three days, it becomes impossible to get back on to the stack with the tractor. It is impossible to seal a stack with the tractor once the crop has reached a certain stage of maturity. The sealing action is primarily directed toward the exclusion of air, a condition which is achieved very satisfactorily with immature herbage. It does not effectively keep out rain, which can damage the upper layers considerably. Stacks required for winter feeding would be better covered with earth. Wedge stacks are subject to the greatest amount of wastage and are the most dangerous to build, besides requiring more work with the fork. If the land is unsuitable for the run-through type of trench, which is subject to the least wastage of all methods, the bun or inverted saucer type of stack should be adopted. Where the clamp or trench is adopted it is particularly important for it to be made twice the width of the tractor so that the wheels are not confined to the same path, with consequent uneven consolidation and water penetration.

—G. L. BANFIELD

* * *

IRRIGATION OF BORDER DIKED PASTURES

IF the soil is very dry, better germination and establishment may be obtained by pre-sowing irrigation. When the soil has drained out sufficiently after being irrigated it should be cultivated to obtain a satisfactory seed-bed. Spring-sown pasture may be successfully irrigated when quite young. The soil should be irrigated carefully to prevent scouring. It is unlikely that autumn-sown grass would require irrigation until the following spring. Irrigation is complementary to rainfall, and for this reason no fixed intervals can be laid down for the irrigation of established pastures. For good growth the soil should be kept relatively moist during the growing season. Irrigation should not be delayed until the pasture shows signs of browning off, as experience has indicated that at this stage an additional irrigation is necessary to restore the pasture to maximum production. Because of variations in the annual rainfall the number of irrigations required to maintain good pasture production cannot be predicted. In a comparatively wet season as few as 2 irrigations may suffice, whereas in a dry season up to 6 irrigations may be applied. When irrigation is being carried out care should be taken to see that water leaking under head gate boards of checks already irrigated is reduced to a minimum by sealing with soil. If experiments with the length of run of the first few checks are carried out, accumulation of surplus water at the bottom of the field can be minimised and both time and water saved. Wherever possible the pasture should be grazed relatively short before irrigation. Rank growth impedes the flow of water down the check, thus prolonging the time required to irrigate.

—G. K. McPHERSON

* * *

IRRIGATION OF LUCERNE

THE weather will govern the number of irrigations applied to lucerne crops throughout the growing season. Winter and spring rainfall usually provide enough moisture to grow the first cut of lucerne without irrigation. After the first cut of hay is taken the field should be irrigated. If very dry conditions prevail, a second watering can be given a week before the second cut of hay is taken. The third and fourth cuts of hay can be treated similarly. Irrigating just before a hay crop is taken is much slower and uses much more water because of the excessive growth of lucerne. Water is beneficial to the young shoots coming away from the crown of the plant, especially in hot, dry weather, when over a week may elapse from the time the hay is cut until the bales are removed and the water applied. The final irrigation is made toward the end of April to assist early growth the following spring. If an early spring topdressing has been omitted, the stand should receive at least 1cwt. of superphosphate after the first cut of hay.

—W. A. McKELLAR

Vegetables for Salads

Upper right—Beetroot should be pulled before it becomes too big and fibrous. Middle left—Radishes are crisp and juicy if pulled at this stage. Middle right—Chives make useful substitutes for spring onions. Lower left—Cucumbers require plenty of food and moisture. Lower right—Tomatoes which were started under cloches. Well looked after such plants can give early fruits for use in salads.

Photographs by Sparrow (upper left, upper right, and middle left), Green and Hahn (middle right and lower left), and Orr (lower right).

HEADING PHOTOGRAPH: The 6 rows from left to right are Tom Thumb lettuce; curled endive; and Mignonette, All the Year Round, Red Cos, and Great Lakes lettuces. R. W. Orr photo.

Summer Salad Vegetables from the Home Garden

SALAD vegetables comprise a large proportion of those grown in gardens during summer and few gardens are normally without them. To be of greatest value salads must be fresh and must be grown quickly, particularly leaf crops. Quick maturity and harvesting just before use will ensure crispness and flavour and that the vitamin content is at its highest. The section of this article on salad vegetables is by C. L. Napier, Horticultural Instructor, Department of Agriculture, Hastings; that on garden work for November is by S. O. Gillard, Horticultural Instructor, Department of Agriculture, Auckland.

IN New Zealand the most popular salad crops are probably lettuces and tomatoes; others, such as radishes, spring onions, and cucumbers, are used to add variety of flavour and perhaps colour. However, some that are less well known are worth trying and are comparatively easy to grow.

Lettuces

Lettuces, which form the basis of most salads, should be sown in small lots at regular intervals, as this will ensure a succession of tender and finely flavoured leaves. A row can be set aside for lettuces and enough seed sown each fortnight to give about a dozen plants when seedlings are thinned.

Seed can be sown from September to March in most districts. Very early or late sowings and plantings can be made on raised beds to ensure good growth. In summer it is usually better to sow lettuces where they are to mature, as conditions are often too dry for plants to be transplanted successfully.

Lettuce seed is usually sown about ¼in. deep, but in dry periods, provided the soil is friable, it can be sown up to 1in. deep.

Manure and Water

Lettuces will grow on a wide range of soils, but a friable loam containing plenty of humus is best. As lettuces should be grown fast, they should receive adequate supplies of water and manure, particularly nitrogen. Blood and bone at about ½lb. per square yard applied and worked in shortly before planting should give good results. To encourage growth later, side dressings of nitrate of soda at 1oz. to each 9ft. of row are beneficial. Side dressings just as lettuces begin to heart will encourage better hearting. Provided that the soil is well drained watering can be copious.

Varieties

There are many varieties and types of lettuce and four types are illustrated on this page. Some types and varieties and their average maturity periods are:—

Crisp-head or crinkled: This is the common type grown in New Zealand. Varieties include Great Lakes (summer strain) 85 to 90 days to maturity; Webbs Wonderful (summer strain) 78 to 88 days; Imperial 847 (summer strain) 84 to 88 days; Imperial 615 (winter strain) 84 to 88 days; and Mignonette (summer strain) 68 to 78 days.

Butterhead or smooth leaf type: This type is popular in England. The leaf edges are not usually frilled and the leaves are smooth to touch. Examples are All the Year Round or Tennis Ball (early summer) 70 to 80 days to maturity and Tom Thumb (very early summer) 68 to 75 days.

Cos or romaine type: Cos lettuces have elongated, upright, loose heads. Although they are not grown much in New Zealand, they are usually of good

★FOR HEALTHIER SHEEP USE—

YOUNG'S SHEEP DIPS

efficient !
safe !
sure !

Backed by many years experience and research by a qualified staff of chemists in a fully equipped laboratory. You can be assured of safe and efficient products particularly suited to your requirements.

CHOOSE FROM THIS COMPREHENSIVE RANGE —

GREEN LABEL PASTE DIP
Gammexane and Phenols combined in a form which ensures destruction of keds (ticks) and lice at all times. Non-Arsenical.

IMPROVED SHEEP DIP POWDER
Arsenical Sulphur preparation fortified by Gammexane.

DEFLY SPRAY
Contains D.D.T. for prevention of maggot or blowfly strike. Lethal to flies on contact and prevents laying of eggs in fleece.

BUISTMARK BRANDING FLUID
Green, Red and Blue. Fully approved by the Department of Agriculture.

YELLOW LABEL PASTE DIP
Destroys ticks and lice and gives efficient protection against BLOWFLY at one dipping. Arsenical.

RED LABEL PASTE DIP
Derris Arsenical. For all external parasites.

FOOT ROT SOLUTION, FOOT ROT PASTE
Absolute efficiency with economy.

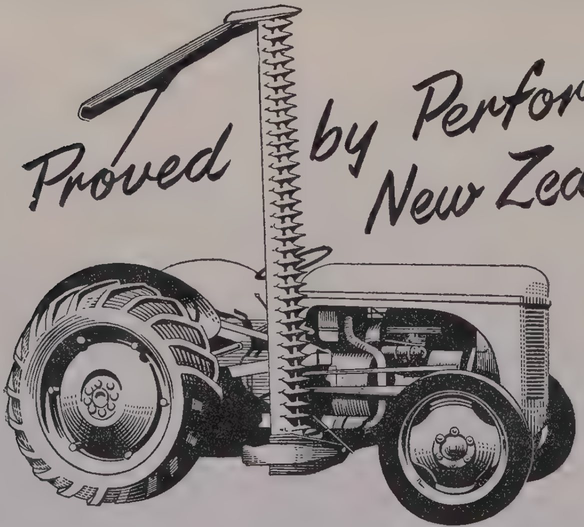
MAGGOT OIL
Clears maggots from wounds, assists in preventing restrike, promotes rapid healing and encourages regrowth of wool.

YOUNG'S- THE PEDIGREE DIP!

YOUNG'S SHEEP DIPS
JASON FINDS THE GOLDEN FLEECE

Consult your local Farmers' Co-operative Association or other appointed agent or write to N.Z. Agent:—**Farmers' Co-op Wholesale Federation (N.Z.) Ltd., P.O. Box 1124, Wellington.**

Proved by Performance — New Zealand's fastest mower!



MÖRTL

M.49 MID MOUNTED TRACTOR MOWER

- ★ Attachable to all popular makes of Tractor.
- ★ Mid Mounted to ensure excellent visibility and perfect control.
- ★ Easily and quickly assembled or detached without the aid of tools.
- ★ Available in 5, 6 or 7 ft. cutting widths.
- ★ Full supply of spare parts always available.

Hundreds of New Zealand farmers have proved during the last 3 years that MORTL Mid Mounted Tractor Mowers are unbeatable for speed, dependability and efficiency.

MORTL Mid Mounted Tractor Mowers cut where all others fail.

Prices range from £98 to £110.

Check the outstanding features of MORTL M.49 Mid Mounted Mowers.

★ Phenomenal demand. Order early and avoid disappointment.

DORING IMPLEMENT SUPPLIES LTD.

19 Clyde Street, Whangarei.
P.O. Box 548 Palmerston North.
Stoke, Nelson.
P.O. Box 632 Hamilton.
P.O. Box 1179, Wellington.
P.O. Box 1203. Christchurch,
Waihi Road, Hawera.
Bledisloe Avenue,
P.O. Box 99 Gore.

OM.1.13

texture and flavour and well worth a trial in home gardens.

There are varieties described as white (actually green) and red which mature in about 90 days.

Leaf or bunching type: Plants of this type do not heart, but grow in a rosette as does endive. Bronze Beauty (shown in the illustration at right) is the colour its name suggests. It is a rapid grower, maturing in 40 to 50 days, and withstands fairly dry conditions. The nutty flavour and rapid growth of this lettuce justify more widespread planting of it.

Add Colour to Salads

Mignonette, Red Cos, and Bronze Beauty, all being red types, are valuable for adding colour to salad dishes.

Butterhead types can be thinned to 6 to 8in. apart, but all other types should be given more room in which to develop.

Tomatoes

Tomatoes are a good source of vitamins A and C and therefore an important vegetable for everyday diet. Surpluses from home gardens can be preserved for use in winter. Tomatoes should be left on the plant long enough to develop full flavour.

Soils and Manures

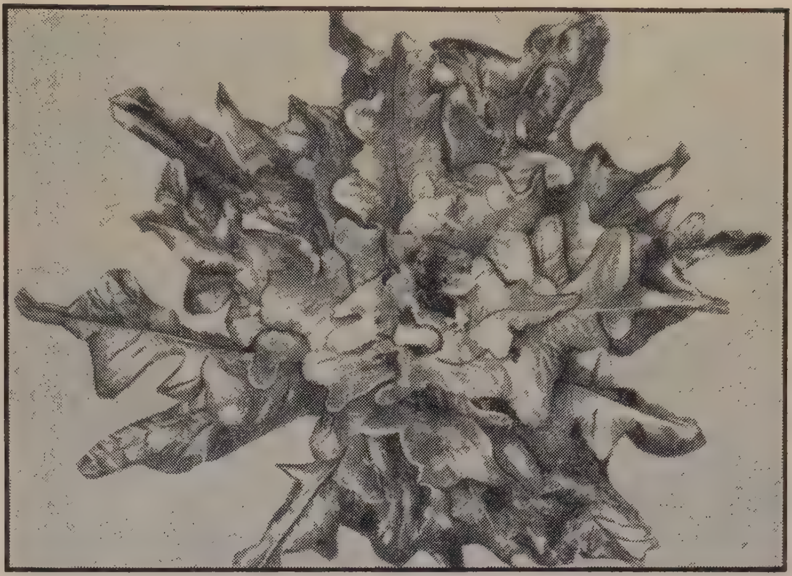
Tomatoes will grow on a wide range of soils, but those rich in organic matter that will hold moisture and plant foods are best. Lighter types of soils are usually better than heavy ones. If organic matter is added to soil in which tomatoes are to be grown, it is best to do this a few months before planting.

Where good quantities of animal manure are available tomatoes may succeed without the addition of artificial fertilisers. However, experiments have shown that crops are better when both animal manure and fertilisers are applied. Different soils require different manurial treatment, but a mixture in the ratio of 5lb. each of blood and bone and superphosphate and 1lb. each of sulphate of ammonia and sulphate of potash should be satisfactory. This can be applied at from about 1½ to 5oz. a square yard according to soil conditions and plant growth.

Planting

Tomatoes are best set out from October onward as far south as Nelson and in November and December from Marlborough to Southland. Plantings will of course depend on the incidence of frosts. Where gardeners raise their own plants they should allow 6 to 8 weeks from sowing to planting. In most districts seedlings for early plantings have to be raised under glass. Where only a few plants are required it may be best to purchase good sturdy ones from a seedsman.

Seedlings can be raised in beds, boxes, or pots, the last two methods being the most satisfactory. Seedlings in pots can be knocked out easily and are not checked by being transplanted. With tall varieties stakes should be driven in before plants are set out, as this reduces risk of root damage. A warm corner or the sunny side of a fence is an ideal situation. The lower right illustration on page 322 shows an open trellis system on the west side of a fence on which plants each with two leaders were trained. These plants were started under cloches and gave an excellent crop.



[R. W. Orr

Bronze Beauty non-hearting lettuce adds colour to a salad and is also crisp and sweet.

Varieties

Dwarf varieties are successful in the districts with fairly dry summers and give good crops. As dwarf varieties should be planted at least 3ft. apart, they take up more room than tall varieties, but do not require as much attention. Tall varieties can be planted 18in. apart. The fruits of some dwarf tomatoes are not as attractive as those of many tall varieties, but they are suitable for pulping, cooked dishes, and relishes. However, they are favoured by some for use raw because of their fleshiness.

Some recommended dwarf varieties are Stoners Dwarf Gem, Adelaide Dwarf, Tartinta, Bounty, and Early Chatham.

Tall varieties which should do well are Potentate, Carters Sunrise, Moneymaker, and Stoners Prolific.

To obtain best results from tomatoes they should be harvested regularly but not before they are coloured.

Radishes

The first sowing of radishes can be made as soon as soil and air conditions begin to become warm. Radishes are fairly hardy and grow quickly. They are a fair source of vitamin C.

Unless they are grown quickly and pulled consistently, radishes will be soft, hollow, and unpalatable. Although they will grow during hot weather, they do best in the cooler periods. A good supply of moisture is essential for crispness.

Sowing

Seed can be sown in rows or broadcast in beds. Early crops may do better in raised beds, as these tend to be warmer. A continuous supply of radishes can be ensured and waste reduced by sowing short rows at fortnightly intervals.

For quick growth light but rich soils are best. Fine organic matter like compost is ideal and fertilisers such as sulphate of ammonia and blood and bone will also encourage quick growth.

Seed should be sown thinly about ½in. deep in either beds or drills, as then plants will require almost no thinning. Radish seed can be mixed with seed of other crops, such as carrots, and both sown together, or it may be sown between lettuces (lettuce seeds sown every 8in.) to save space. As soon as radishes reach a usable size they should be pulled and used immediately.

Spring Onions

Spring onions add a pungency to salads that might otherwise lack variety of flavour. Any variety of onion can be used, and in addition to the usual sowing seed can be sown at any time in summer provided seedlings will develop sufficiently. White Lisbon and Odorless are two varieties often used for spring onions because of their mild flavour.

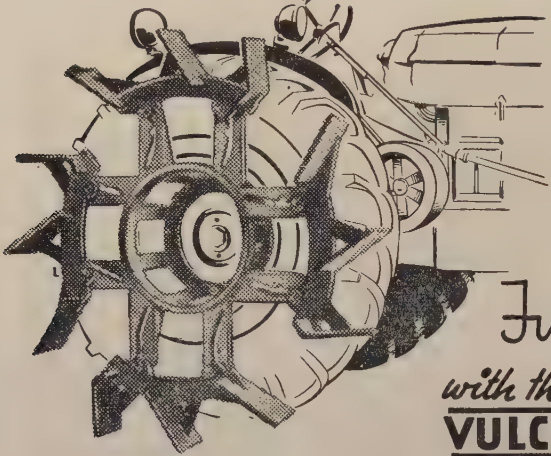
Spring onions will grow in most types of soils, but for early crops the soil should be well drained. Raised beds assist drainage in early spring and satisfactory results will be obtained from seed broadcast thinly on these beds. For a continuous supply of young plants small sowings can be made fortnightly.

In the early stages of growth onions require nitrogen perhaps more than other plant foods, but phosphate is also needed; 1oz. of sulphate of ammonia and 4oz. of bonedust or 2oz. of superphosphate to each square yard or 9ft. of row should be sufficient.

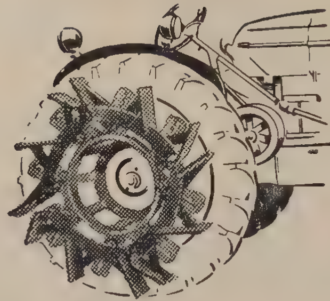
Seeds should be sown not more than ½in. deep and the filling should be firmed to assist germination and quick root development. As they are used when young, spring onions should not require thinning.

Chives

Chives, which are often called multiplying onions because of the manner



Gripper Expanded Ready For Hard Work.



Gripper Retracted For Road Use.

Full tractor power in heavy going with this VULCAN RETRACTABLE GRIPPER

Dunn's patent Nos. 91473 and 96873

N.Z.'s MOST EFFICIENT GRIPPER!

Maximum tractor power in heaviest conditions. Permanently bolted to wheels, fits all modern tractors. Unique paddle-action blades ensure firm grip, clean withdrawal.

Blades are extended or retracted quickly, simply—with two intermediate positions for varying conditions. All-steel construction, **NO** moving parts to bend or break.

ORDER NOW FOR FORWARD DELIVERY

Enquire From Your Mercantile, Stock & Station, or Tractor Agent.
Manufactured by J. Johnston & Sons Ltd., Manufacturers and Engineers, INVERCARGILL.

Send
for
FREE
FOLDER

Messrs. J. Johnston & Sons Ltd.,
Manufacturers & Engineers, P.O. Box 47,
Invercargill.
Dear Sirs,
Please send FREE folder giving details of Vulcan Retractable Gripper.

NAME ....
(Block Letters)

ADDRESS ....

.... J.A.

(State make and model of Tractor and tyre size.)

The SEED *that made the* HARVEST *possible*

The reaping of a harvest from farming enterprises is often dependent upon sound business counsel and suitable banking facilities. Thousands of farmers find in the unrivalled facilities of the Bank of New Zealand the personal and friendly service they require.

BANK OF NEW ZEALAND

The Bank that conducts the largest banking business in the Dominion.
Established 1861

23.1C

in which clumps enlarge, make excellent flavourings for soups, stews, and salads.

A clump of chives can normally be purchased from a seedsman. This can be set out with other herbs and can remain undisturbed for several years. When the clump appears to be growing too large it can be lifted in spring and divided into smaller clumps, which can be replanted.

Harvesting can consist of cutting the leaves only or of taking portions of a clump and using the small bulbs as well as leaves.

Cucumbers

Cucumbers should grow satisfactorily in districts where tomatoes can be grown, but cucumbers require more moisture and food than tomatoes if they are to crop well. Soils should be rich in organic matter such as stable or poultry manure or compost. If fertiliser is thought desirable, a mixture of about 4 parts of blood and bone and 1 part of superphosphate by weight can be added before the cucumber seed is sown. A side dressing of blood and bone about flowering time should promote vigour and assist in the formation of fruits.

Many gardeners sow cucumbers and other vine crops on hills set a few inches above the ordinary soil level. In some districts this may be satisfactory, particularly where ground water or artificial water supply is adequate. In districts where summers are dry, hills may be a disadvantage, particularly if they cannot be watered regularly. Where it may be difficult to supply sufficient water it is better not to form hills.

Sowing

Seed should be set from ½ to 1in. deep, depending on the type and condition of the soil. Very early sowings are better set shallow. As with tomatoes and any other frost-tender subject cucumbers can be started early under cloches. A group of about three seeds can be set every 3 to 4ft. and plants thinned later to one or two sturdy plants. When the runners are 2 to 3ft. long the tips should be pinched out to encourage lateral growth.

If desired, cucumbers can be started in boxes or pots. Pot germination is best, as the plants can be knocked out gently with little danger of root damage. Vine crops are very difficult to transplant and great care is therefore necessary. To encourage prolific growth of succulent fruits cucumbers should be harvested regularly and before they get too old. Regular watering during dry periods will maintain growth and assist in giving crisp fruits.

There are numerous varieties, but the following are suitable for most districts: White Spine, Long Prickly, Moneymaker, and Crystal Apple. The last named, one of the apple varieties, should be cut when the skin is a lemon colour but before it turns a deep yellow. Cucumbers mature in from 60 to 80 days.

Mustard and Cress

Mustard and cress can be used cut finely for garnishing salads or for sandwich fillings. Mustard (*Brassica alba*) is usually sown in boxes or pots and cut with scissors. It can be sown on fine soil or bulb fibre and covered with a very thin layer of fine soil. Mustard is cut when 2 to 3in. high.

[*R. W. Orr*

Mustard and cress can be raised in boxes and cut with scissors when a few inches high.

Cress (*Lepidium sativum*) is raised the same way as mustard, but should be sown about 1 week earlier, as it is slower growing.

To achieve best results regular sowings should be made, although if seed is unavailable, the stems remaining after cutting often come away. The time taken to reach the cutting stage varies according to the weather, but in summer, provided moisture is available and the greens are shaded during the hottest part of the day, mustard should be ready in about 1 week and cress in 2 weeks. The illustration above shows how the greens can be cut. Although the greens illustrated were larger than when they should normally be cut, they were quite edible and not too bitter.

Mustard and cress are greens that even flat dwellers can raise provided they have available flower pots about 6in. in diameter or seedling boxes.

Endive

Endive (*Cichorium endiva*) has been used for food since the days of the ancient Egyptians. In early times endive was used raw and cooked, but today it is used mainly raw in salads. However, it can be cooked and eaten like other greens. Large quantities of endive are eaten in Europe, where often it takes the place of lettuce.

Types

There are two main types of endive, the green-curled and the broad-leaved Batavian. Curled types grow to about 20in. in diameter. They have a more attractive flavour than the Batavian type and are therefore better for salads. The Batavian type is best cooked, but can be eaten raw when blanched. It is more satisfactory for winter cropping. The quality of both types is best if they are eaten before they are fully mature.

Culture

Endive requires the same cultural conditions as lettuce and in the warmer districts can be sown from October to April. Late sowings will give winter greens. As with lettuce moisture and food supply should be adequate to produce tender plants. Slow-growing plants tend to be bitter.

As endive grows larger than lettuces, plants should be set out up to 20in. apart in the rows. Plants do not heart, but form rosettes. The whole plant or leaves can be used.

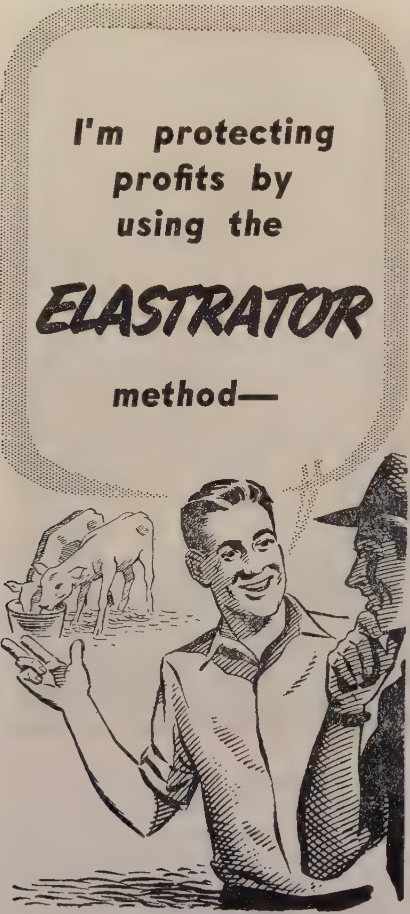
Blanching

All endive is improved by blanching, after which it appears to lose its bitterness. Blanching is done when plants are almost fully grown by drawing all the leaves together and tying the bunch near the top so that the inner leaves are blanched. Blanching takes 20 to 30 days, depending on the weather. The leaves should be perfectly dry before being tied; otherwise the hearts of the plants may rot.

Blanching can also be done by covering plants with straw or boxes that exclude all light. Only a few plants should be blanched at a time, as leaves deteriorate rapidly after treatment.

Peppers

Peppers are species of capsicum and include chillies, the hot types used as flavouring. The plants are frost tender and therefore should be planted out at


I'm protecting profits by using the ELASTRATOR method—

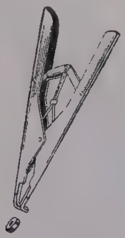
Castrate Calves, lambs without setback — use

ELASTRATOR

and the Rubber Ring.

Calves on the bucket or on the dam castrated with the Elastrator Rubber Ring go ahead without setback. The younger the better. Safe, bloodless, simple and effective. Widely acclaimed by American and Australasian cattlemen.

Sheep too! The ELASTRATOR is made to order for dairy farmers who run small flocks. Simply carry the ELASTRATOR and rings in your pocket, apply rings to new born lambs—the castration is easy, bloodless and effective.



ELASTRATOR CO. LTD.
P.O. BOX 226, BLENHEIM.

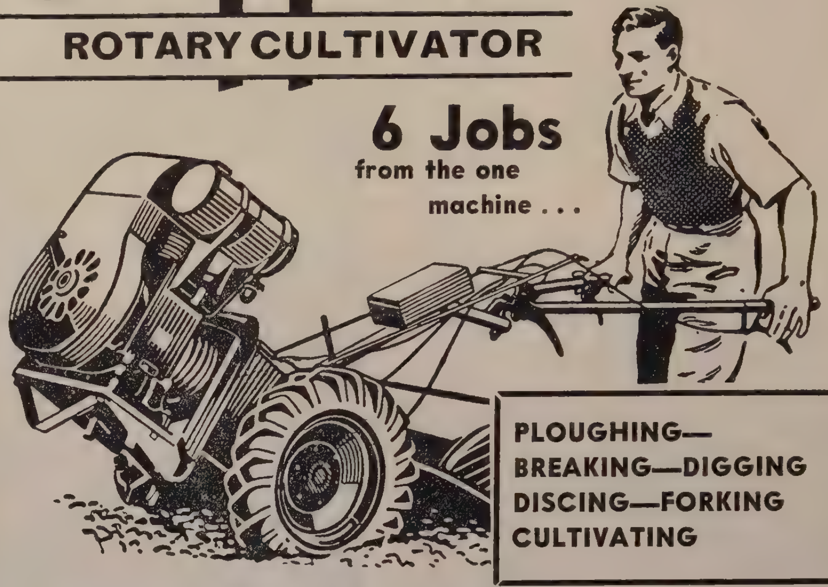
Clifford

Britain's Leading

ROTARY CULTIVATOR

6 Jobs

from the one machine . . .



PLOUGHING—
BREAKING—DIGGING
DISCING—FORKING
CULTIVATING

FULLEST INFORMATION FROM YOUR NEAREST DEALER . . .

Authorised "Clifford" Distributors:
Auckland: Broadway Motors Ltd. **Dargaville:** Gordon Bell. **Whangarei:** Whangarei Motors. **Tauranga:** G. E. Clark & Sons Ltd. **New Plymouth:** R. J. Burkitt. **Stratford:** Sayers Bros. **Wanganui:** Linwood Motors Ltd. **Hastings; Napier; Palmerston North:** Agnew Refrigeration Ltd. **Wellington:** Wright Stephenson & Co. Ltd. **Nelson:** N. W. Gill. **Motueka:** Farm Services (Motueka) Ltd. **Christchurch:** Mason Struthers & Co. Ltd. **Dunedin:** Reillys Central Parking Station. **Invercargill; Gore:** Gormack, Wilkes, Davidson Ltd.

RENOWN PUMPS

AND AUTOMATIC PRESSURE SYSTEMS –

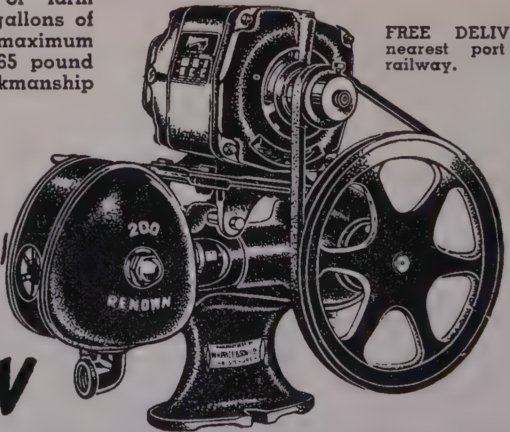
HERE IS THE NEW "200"

Designed for household or farm water supply. Pumps 200 gallons of water per hour with a maximum total head of 150 feet or 65 pound pressure. Years good workmanship guarantee.

IMMEDIATE DELIVERY
£17/10/-
complete, less motor.

FREE DELIVERY nearest port or railway.

THE "200" RENOWN



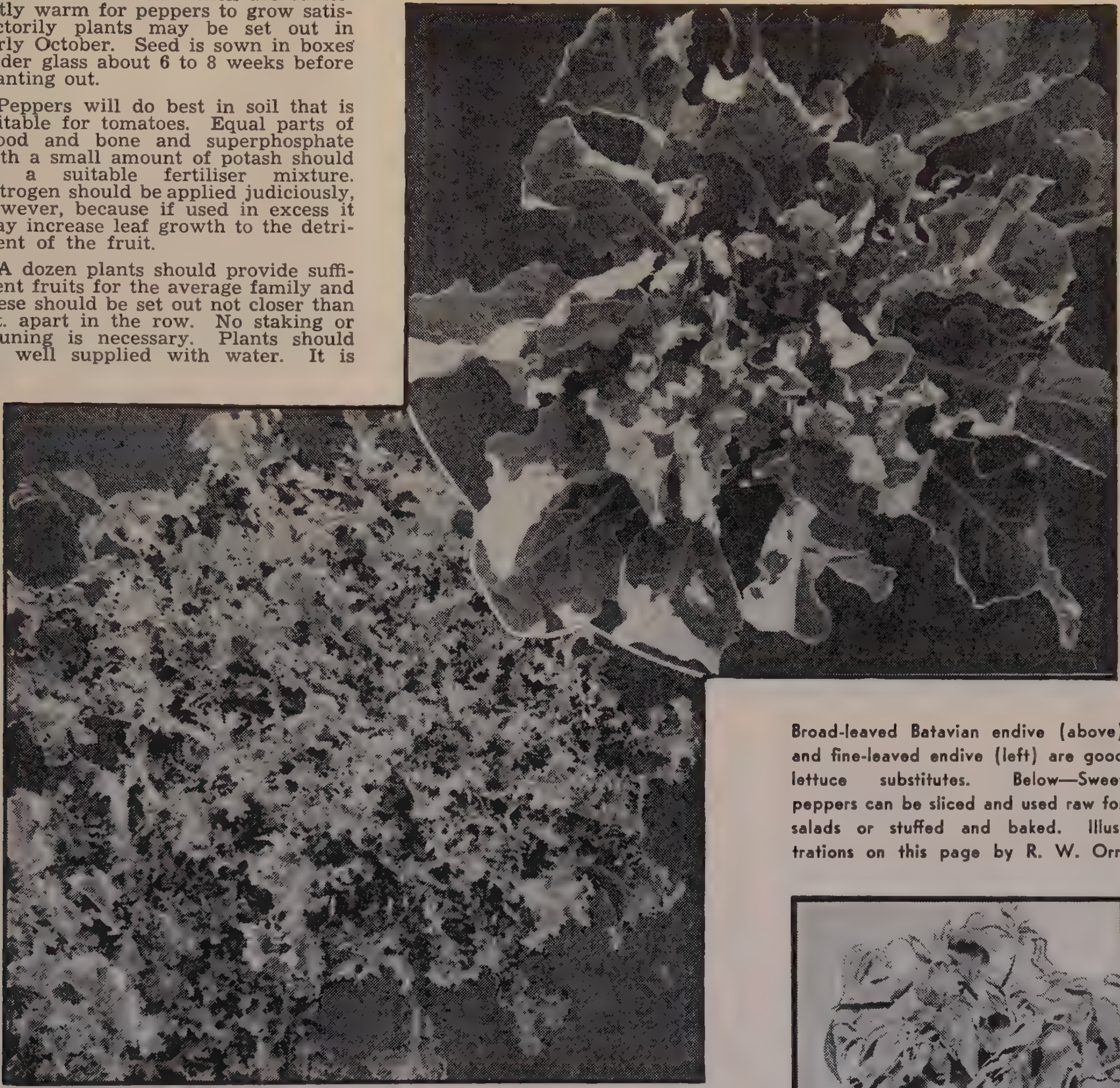
Inquire from your nearest Machinery Dealer or

W. H. PRICE & SON LTD.
34-36 Manchester Street, Christchurch. Est. 1897. P.O. Box 1084.

the same time as tomatoes. For salads sweet peppers (*C. grossum*) are grown. In districts which are sufficiently warm for peppers to grow satisfactorily plants may be set out in early October. Seed is sown in boxes under glass about 6 to 8 weeks before planting out.

Peppers will do best in soil that is suitable for tomatoes. Equal parts of blood and bone and superphosphate with a small amount of potash should be a suitable fertiliser mixture. Nitrogen should be applied judiciously, however, because if used in excess it may increase leaf growth to the detriment of the fruit.

A dozen plants should provide sufficient fruits for the average family and these should be set out not closer than 2ft. apart in the row. No staking or pruning is necessary. Plants should be well supplied with water. It is particularly necessary during hot, dry weather to prevent drop of blossoms or young fruits.



Broad-leaved Batavian endive (above) and fine-leaved endive (left) are good lettuce substitutes. Below—Sweet peppers can be sliced and used raw for salads or stuffed and baked. Illustrations on this page by R. W. Orr.

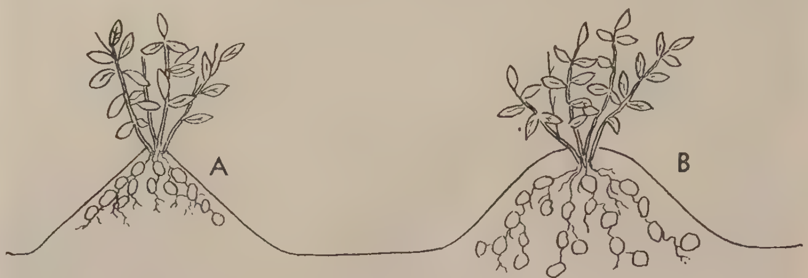
Peppers require at least 3 months and in New Zealand fruits should be ready during February. Good varieties are California Wonder and Harris Early Giant, fruits of which are similar to those illustrated at right. For salads the fruits, which are hollow, are sliced. Peppers can also be stuffed with mincemeat and onions and baked. The stem is usually cut out with the core and stuffing forced through the hole.

Other Crops

Other vegetables commonly used in salads include celery, peas, carrots, asparagus, beetroot, parsley, and mint, the last two being used for garnishing and flavouring. Although peas, carrots, and asparagus are normally grown for uses other than in salads, they can be added to salads. Carrots, however, can be grated raw and added to provide colour. Gardeners with even very small plots could profitably raise a few carrots for salads. Very thin broadcast sowing gives fair sized roots for salads or other flavourings.

Beetroot

Beetroot should be sown very thinly and pulled before the roots become too large or fibrous. Beetroot and carrots require very similar conditions and a fertiliser similar to that recommended for tomatoes should suffice for them.



Moulding up potatoes. A—The wrong way to draw the soil up to potato plants; there is no room for tuber development and the potatoes are liable to exposure to sunlight which turns the tubers green and makes them inedible. They also become an easy prey to the potato tuber moth and blight spores. B—The correct method of moulding. The wide, flat-topped ridge can take in and retain moisture and there is plenty of room for the potatoes to develop well under the surface.

Work for November

By November the weather has become pleasanter and there is a marked improvement in the growth of plants. As most gardens will be well planted with a variety of vegetables, there will be plenty of work. The ground should be kept cultivated, weeds removed between growing crops, and thinning done where necessary.

Supports for runner beans and tall tomatoes should be placed in position without delay. If staking is delayed too long after planting, the roots of the plants may be injured. If it is intended to plant early celery, beds should be prepared now. Early planted potatoes should be moulded up as they grow and the main-crop planting completed. Asparagus beds that have been producing spears for the past 8 weeks should now be allowed to develop fern growth. Harvesting asparagus over too long a period weakens the crowns, as it prevents the plants from building up sufficient strength to produce next season's crop.

The rhubarb bed will need attention. Rhubarb is a heavy feeder and requires several applications of fertiliser during the growing season. These are best applied and worked lightly into the soil after pulling, which should never be too severe. Too frequent or too heavy harvesting exhausts plants and does not give them time to build up sufficient quantities of plant food for the next season. Newly established rhubarb plants should not be harvested during the first year and only sparingly the second season. Rhubarb should not lack moisture and will benefit from frequent applications of liquid manure.

Onion crops will now be beginning to develop bulbs and should be weeded and lightly cultivated. In soils where growth is slow a side dressing of nitrate of soda at 2oz. a square yard is advisable.

Early sown peas will now be reaching maturity, and if birds are attacking the nearly mature pods, they can be frightened off by stretching strands of black cottton just above the rows. Cabbage, cauliflower, and lettuce plants which are beginning to heart will benefit from an application of liquid animal manure. If this is not available, 1oz. of nitrate of soda can be added to 1 gallon of water and the liquid applied at the rate of 1 pint to each plant.

Where potato blight is prevalent potato and tomato crops should be sprayed frequently. Brassica crops are likely to be attacked by white butterfly and diamond-backed moth, and if the caterpillars of these moths are seen on the plants, they should be sprayed with D.D.T. 50 per cent. wettable powder (½oz. in 4 gallons of water). In parts of the North Island the green vegetable bug will be appearing now, and where bugs are seen all crops except tomatoes and allied plants which the bugs are attacking should be sprayed with H.E.T.P. (1 teaspoon to 1 gallon of water). As the tomato family will not tolerate H.E.T.P., the green vegetable bug should be controlled on these plants by the use of D.D.T. as for caterpillars on brassicas.

Sowings

Pumpkin, squash, and marrow can be sown in all districts except south Otago and Southland. Recommended varieties are:—

Pumpkin: Crown, Triamble, Queensland Blue. Squash: Red Warren, Golden Hubbard. Marrow: White Bush, Green Bush.

Home Garden Bulletins

Nos.
258 Raspberry Culture in New Zealand.
282 Currant Culture in New Zealand.
297 Gooseberry Culture.
321 Strawberry Culture.
340 Soil Fertility in the Home Garden.
342 The Home Vegetable Garden. 2s. 6d.
349 Chinese Gooseberries.

(Free unless stated otherwise.)

The above bulletins are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

Beans: Dwarf and climber beans can be sown in all districts, though in south Otago and Southland it may still be necessary to protect plants from frost. Good varieties are:—

Dwarf: The Prince, Canadian Wonder. Climbing: Fardenlosa, Scarlet Runner.

Sweet corn: Seed may be sown in all districts except south Otago and Southland. A good variety is Golden Cross Bantam.

Cucumber: Seed can be sown in the open, but where late frosts are likely some form of protection must be provided for the young plants. Good varieties are White Spine, Long Prickly, Moneymaker, and Crystal Apple.

Melons: These will not thrive in cold, wet soils or in cold weather and rarely can be grown successfully in southern districts except under glass. Recommended varieties are:—

Rock melons: Honey Dew, Hales Best, Casaba. Water melons: Coles Early, Ice Cream, Hawkesbury. Preserving melons: Citron (red seeded) and Pie (green seeded).

The following may be sown in all districts:—

Beetroot (Crimson Globe, Detroit Red), silver beet (Lucullus, Fordhook Giant), carrot (Chantenay, Manchester Table), peas (Greenfeast), lettuce (Great Lakes, Neapolitan), radish (French Breakfast, White Icicle), and spinach (Prickly).

For transplanting later the following may be sown in seedling beds:—

Leek (Musselburgh), lettuce (Great Lakes, Neapolitan), celery (Golden Self-blanching), brussels sprouts (Fillbasket), and broccoli (Winter Mammoth, Lily White, Veitches Self-protecting).

Cauliflower (Early London, Roscoff, Phenomenal) may be sown in southern districts and tomatoes (Potentate and Moneymaker) in Auckland and Northland for a late crop.

Plantings

Potatoes for a main-crop should be set out without delay. Good main-crop varieties are Arran Chief, Aucklander Short Top, King Edward, Inverness Favourite, and Dakota (southern districts).

Kumara plantings should be completed in districts north of Manawatu. Local varieties are New Zealand Red and New Zealand Pink.

Tomatoes: In all districts plantings may be made of tall varieties such as Potentate, Carters Sunrise, Moneymaker, and Stoners Prolific.

Lettuce: A summer variety such as Great Lakes or Neapolitan should be chosen for planting this month.

Cabbage: In districts from Manawatu south plantings may be made of Golden Acre, Copenhagen Market, and Hendersons Succession.

Egg plant and sweet pepper: In districts with a climate suitable for these frost-tender species egg plant (New York Improved) and sweet pepper (California Wonder) may be set out.

Production of Quality Pig Carcasses

THE market for baconers has already become much more selective than it has been for a considerable number of years. Though fresh meat, which includes porkers, will not be in full supply in the United Kingdom for some time yet, it is not too early for countries who expect to have a share in the highly competitive market which is likely to return to take steps to produce what the customer wants. What constitutes quality, including the preferred carcass weights, must be studied by the producer. In this article A. Longwill, Superintendent, Pig Industry, Department of Agriculture, Wellington, discusses these points and shows how management and feeding can produce immediate results in quality and profits.

[*Sparrow*

The grader checks backfat thickness over the third rib vertebra, the standard point of measurement of shoulder fat under New Zealand standards.

THERE has been a sellers' market for all meat products, including pig meats, for 8 years since the end of the war and in that period, as well as during the war, there has been no financial encouragement to producers to take pains by breeding, feeding, and management to achieve a high-quality product which will sell in competition with the best. The sellers' market has already passed and the problems of producing for a buyers' market must be faced afresh.

Both the local and export markets for baconers have already become selective and it will not be long before the unwanted fat pig will be penalised severely. Buyers of porkers cannot yet be so discriminating and the New Zealand porker under 90lb. carcass weight is generally the most sought after frozen pork on the United Kingdom market. Much more of it could be sold if it were available. The extent of the market for New Zealand pork in the days of keen competition which are sure to come may depend on the quantity and quality produced in the next year or two.

In 1950 the New Zealand Meat Producers Board, on the recommendation of the pig producers' representatives, initiated payment of a premium on porker-weight pigs aimed at encouraging the production of lighter pigs generally and the keeping of more sows. The response, though it may have been slow, has been steady, and in the last year, in which the United Kingdom has paid a substantial premium on porkers, there has been a growing interest in the trends on the market and in quality.

What Constitutes Quality

Under a completely free market the the combined demand of the mass of consumers and the price differentials they are prepared to pay determine what quality is wanted on any particular market. This has to be interpreted by the butcher, wholesale meat operator, bacon curer, or other operator in the trade, and grading to recognised standards, with premiums or penalties according to grade, is the only practicable way of giving effect to the demand for quality.

Briefly, the modern trend is a growing preference for smaller cuts and leaner meat. Though the meat must be prime and tender, it must carry only a moderate fat cover. This thickness of fat cover, measured at points on the backfat, is the main criterion on which quality grading of pig carcasses is based. Measurement standards vary according to the weight of the carcass, but two points are worth making in this connection.

1. As pigs reach maturity they tend to put on fat more rapidly and may become overfat if allowed to grow at full rate.
2. Within each weight range over which a particular backfat thickness standard operates the lighter carcasses are most likely to come within the limits of backfat thickness specified. For example, to be graded Prime 1, pigs in the weight range 141-160lb. must not exceed 2in. shoulder fat over the third rib vertebra and 1¼in. at the middle of the back over the last rib vertebra. The 160lb. carcass which is graded Prime 2 because of excess fat probably would have graded better at a lighter weight. This is merely part of the "rough justice" which has to prevail, as it is impossible to vary the measurement standard for each pound or two of carcass weight. The producer should learn to use these facts to his advantage.

Grading

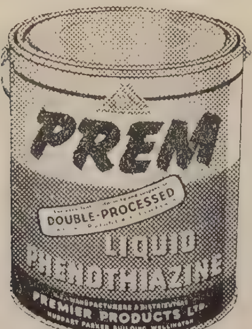
A wholesaler who has an extensive business will be more interested in large, uniform lines, even though the general quality may range around a level which is only average for the whole pig population, and would not be prepared to pay a higher price for a higher quality selection if this constituted only a relatively small parcel. This is one of the difficulties at the present level of production in New Zealand of getting a really worthwhile premium paid to the producer of the above-average quality pig.

However, this is a difficulty which must be overcome and can be with the good will of all concerned in the progress of the industry. A grading system which gave a break-up for a total baconer kill of 100 pigs of 150lb. average carcass weight of 30 per cent. A, 60 per cent. B, and 10 per cent. C grade would return prices per pound under "no-grade" selling and under grading as in Table 1.

Whereas in the above example all pigs of 150lb. carcass weight are paid for at £10 per head under a no-grade system, the A grade pig is worth nearly 10s. more, B grade about 3s. less, and C grade about 10s. less when paid for according to the differentials set out in the table. Thus there is a premium of almost £1 per pig for

TABLE 1—RETURNS FROM 100 BACONERS ON NO-GRADE AND GRADED BASIS

No. of pigs	Average deadweight	No grade Per lb.	No grade Total	Graded Per lb.	Graded Total
		s. d.	£	s. d.	£ s. d.
30	150	1 4	300	1 4¾	314 1 3
60	150	1 4	600	1 3¾	590 12 6
10	150	1 4	100	1 3¼	95 6 3
			£1000		£1000 0 0



EASY-RUNNING
PREM

LIQUID PHENOTHIAZINE

It's ready for use after a preliminary shake.

Our unique manufacturing method ensures a high efficiency, easy running drench that needs no stirring and won't clog instruments. Walk into any stockists and ask them to remove the lid from a gallon tin of PREM . . . any tin. See for yourself how PREM is perfectly mixed in a smooth, even suspension with no sign of settling out.

For speed and ease in administration, select the new PREMIER instruments.

TRANSPORT-TESTED

Shuttled back and forth by rail for 2,400 miles, PREM liquid phenothiazine shows no sign of settling out.

VIBRATION-TESTED

Continuously shaken for 20 hours on a table vibrating 23 times a second, PREM stays in perfect suspension . . . and still runs freely.

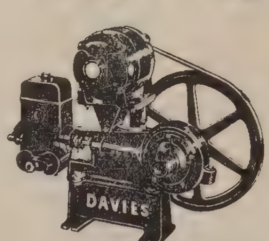
LABORATORY-TESTED

Every batch of PREM must pass rigid laboratory tests for particle size and viscosity before release.

N.Z. Manufacturers & Distributors
PREMIER PRODUCTS LIMITED

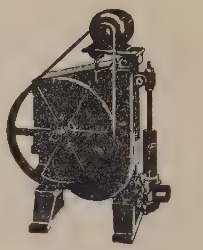
DAVIES

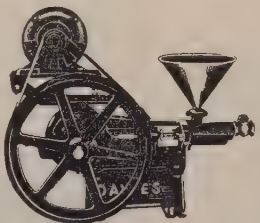
Present FOUR from their Range of RELIABLE PUMPS for all purposes.



"DAVIES 250"
Two capacities:—250 G.P.H., with 150′ max. head; and 190 G.P.H. 200′ max head; Engine or electric drive. Also fitted up as 47 or 90 gallon pressure outfits. £21/5/-. Motor extra.

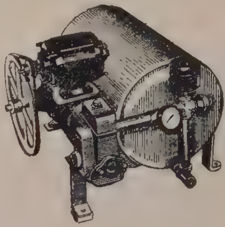
"DAVIES 109"
Self oiling Deep Well Power Unit for Wells deeper than 25 foot. Supplied as 47 or 90 gall. automatic pressure outfit or open tank service. Max. well depth 300ft. £57/4/-. Motor extra.





"DAVIES 101"
Self oiling Skim Milk Pump designed for pumping Skim Milk away from the separator to pig pens or drums. All brass barrel and plunger. Stainless steel rod. No. 1, 120 G.P.H. No. 2, 200 G.P.H. Electric or Engine drive. £15/9/-. Motor extra.

"DAVIES S.P.15"
Domestic pressure outfit 250 galls. per hour, 15 galls. pressure tank. Automatic operation. An ideal unit where capacity requirements are not heavy or water supply is limited. Height, 2′. Length, 2′ 6″. Width, 2′. £49/-/-. Motor extra.

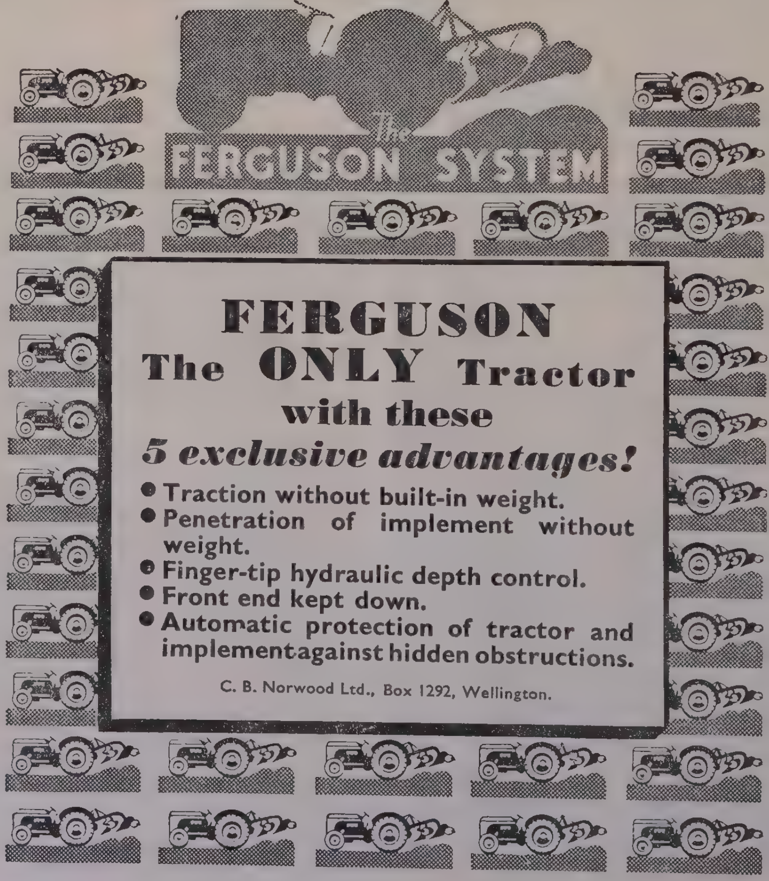


All pumps carry maker's full guarantee of satisfaction. Prices F.O.B. Auck.

TRADE ENQUIRIES INVITED BY THE MANUFACTURERS.

D. H. DAVIES & CO. LTD.

404 Broadway, Newmarket, Auckland. Phones 22-458 Business 87-261 after hours.
Manufacturers of Skim Milk Pumps, Deep Well Gearings, Pressure Outfits.



FERGUSON
The ONLY Tractor with these
5 exclusive advantages!

- Traction without built-in weight.
- Penetration of implement without weight.
- Finger-tip hydraulic depth control.
- Front end kept down.
- Automatic protection of tractor and implement against hidden obstructions.

C. B. Norwood Ltd., Box 1292, Wellington.

the good pig compared with the poor one, and though this may not be sufficient under present prices to give encouragement to the production of better quality carcasses, it shows what a difference even small differentials make to the return per pig. Where 100 pigs of any one grade were sold in a year the difference between A grade and B grade would be £65; between A grade and no grade it would be £50.

No producer would get all his pigs into the one grade. The man whose pigs grade exactly as shown in the example would be as well off under grading as no grading, but he would have the incentive to try to get a larger proportion of A grade.

It may be asked: "When you have made progress and a substantial number of your pigs are A quality where are you going to get the premium for quality?" There need be no difficulty about this, as the market will be in a position to pay the higher over-all price because of the higher general level of quality; but there will be a penalty for poor quality.

To be effective grading must be applied to all fat pigs marketed, whether for pork or bacon, sold on hooks, or sold by auction. That could not be done easily without putting a "straitjacket" on marketing, but, given good will on all sides, it does not present an insuperable problem.

Economical Weights for Marketing Pigs

There are three main considerations which affect the economical weights at which to market pigs.

1. As a pig grows progressively more food is needed for each 1lb. added to its weight because:—

Maintenance requirement increases.

Fewer calories (700) are required to lay down 1lb. of muscle than 1lb. of fat (4000).

In the early stages the weight gains consist of a fairly high proportion of water and protein and a low proportion of fat in contrast to the finishing stages, when mainly fat is being deposited. (See Tables 2 and 3.)

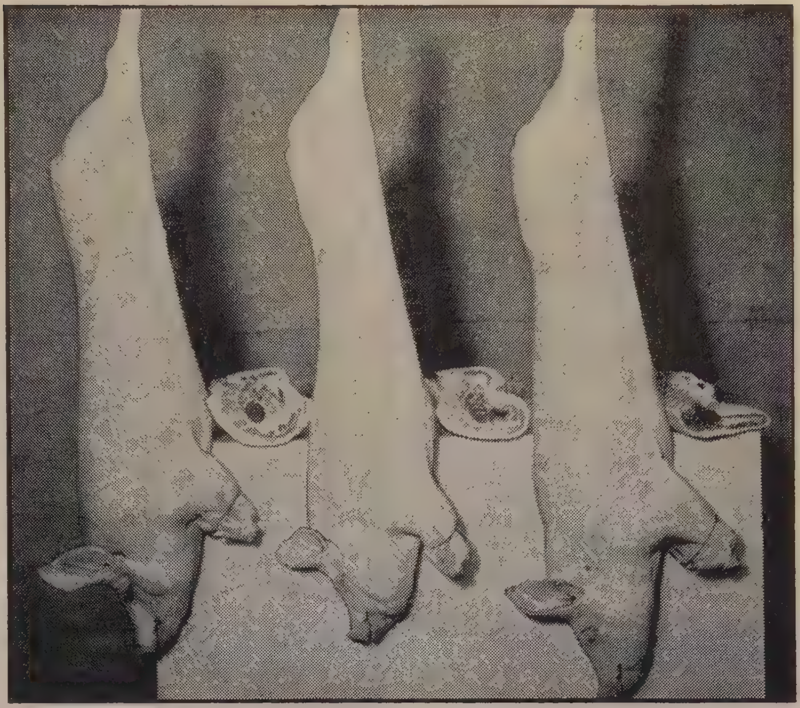
TABLE 2—FEED/WEIGHT GAIN RATIOS

Liveweight of pig	Pounds of food (food units) consumed	
	Per lb. liveweight gain	Per lb. carcass gain
lb.		
40	1.8	3.1
50	2.0	3.3
60	2.2	3.5
70	2.3	3.7
80	2.5	3.9
100	2.8	4.3
120	3.1	4.7
140	3.5	5.1
160	3.8	5.5
180	4.1	5.9
200	4.3	6.3

TABLE 3—CHEMICAL COMPOSITION OF PIGS (Empty liveweight)*

	Water per cent.	Fat per cent.	Protein per cent.	Ash per cent.
Newly born	79.95	2.45	16.25	4.06
55 days	70.67	9.74	16.56	3.06
100lb.	66.76	16.16	14.94	3.12
150lb.	56.07	29.08	14.03	2.83
200lb.	53.99	28.54	14.48	2.66
250lb.	51.28	32.14	13.37	2.75
300lb.	42.48	42.64	11.63	2.06

* U.S.A. Department of Agriculture data



[*Sparrow*

These porkers are all under 80lb. The middle one has ideal finish for its weight. That at left is an early maturing pig which would have been better killed at 65 to 70lb.; the pig at right is unfinished and should have been taken on to baconer weight.

2. A share of the overhead costs of the sow must be be borne by each pig fattened from the litter and this cost is lower when there are more pigs and heavier weights.

3. The economical weight to finish pigs is also influenced by the price obtainable for various weight ranges and the weights at which the particular pigs grade best; that is, are at their maximum value per pound.

Porkers the Main Aim

Work carried out by D. M. Smith at the Department of Agriculture's Animal Research Station, Ruakura on skimmed milk feeding shows that factors 1 and 2 above interact so that the point of greatest efficiency in terms of production of pig meat from a given quantity of food is reached at about the 80 to 90lb. carcass weight. When, as today, this weight is favoured by the third consideration and the top rate per pound applies at this weight, there can be no doubt that production of the maximum number of 90lb. porkers would in theory at least return the greatest profit. More sows are the first requirement.

Balanced Production

Because of the seasonal fluctuation of feed supply in New Zealand, however, most farmers find it more convenient to keep fewer sows than would be needed for all-porker production and to turn off about half their pigs as porkers and half as baconers, the latter mainly being sold while the milk supply is increasing and the former mainly when it is declining.

Where this system is followed the best weights to aim at will be:—

Baconers: 140-150lb. Where production is mixed an intermediate-type pig which will tend to be overfat at higher weights will be produced.

Porkers: 80-90lb. These are the most profitable pigs under ruling conditions and superb quality can be achieved by the intermediate-type pig grown quickly to this stage.

Management Problems

Even with the best of planning of farrowings to fit pig numbers and sizes to feed supply there will be occasions when, owing to seasonal conditions, the feed supply will be greater or less than expected and for a period some pigs may have to be taken to heavier weights or, on the other hand, sold at lighter weights. In the first case restriction of feed to the finishing baconers should be practised as indicated in a later section. Dry sows, if not already too fat, might benefit from some of the surplus milk, and what cannot be used may be stored as curd or fed to fowls or other stock.

Weights of finishing that must be avoided are conveniently divided into three categories:—

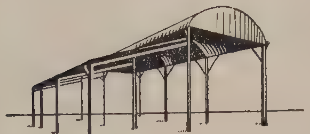
Over 160lb.: These not only tend to be fat and therefore less valuable under a graded basis of sale, but they are of a weight which under present high retail prices is not so attractive to the curer, who finds the strongest demand for rolls and hams of lighter weights. Pigs over 180lb. are now classed as choppers.

Under 60lb.: At the end of the season many pigs reach the works at weights below 60lb. There is no need

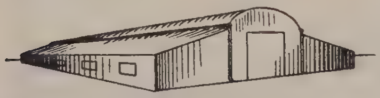
FAMOUS LYSAGHTS

BARNS
and
SHEDS

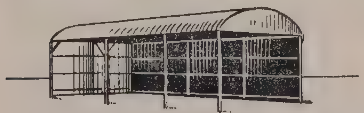
Again Available



Lysaght's Hay Barn with Lean-to Shed on one side suitable for Implement Storage.



Lysaght's Barn with covered ends and Lean-to Sheds on both sides suitable for many purposes.



Lysaght's Barn sheeted one side one end.

Limited Supplies of these popular Prefabricated, ready-to-erect, steel-framed Barns and Sheds again to hand in the following sizes:—

STANDARD BARN A

21ft. wide, 16ft. high to eaves. Lengths: 30ft., 45ft., and 60ft.

STANDARD BARN B

24ft. wide, 16ft. high to eaves. Lengths: 45ft., 60ft., 75ft., 90ft. and upwards.

IMPLEMENT SHEDS

(For attaching to 21ft. wide Barn): 15ft. wide, 9ft. 9in. high on outside, falling from 16ft. inside. Lengths: 30ft., 45ft., 60ft.

(For attaching to 24ft. wide Barn): 20ft. wide, 9ft. 9in. high on outside, falling from 16ft. inside. Lengths: 45ft., 60ft., 75ft., 90ft. and upwards.

Roofing (and walls if required) in High-quality Galvanised Corrugated Iron. Your farm staff can erect these Barns and Sheds. Everything BOLTS together! No riveting or welding! Every section fully pre-fabricated and easily handled. Full directions and easily followed plans supplied.

SEND COUPON TODAY!

L. J. FISHER & CO. LTD.,
30 Anzac Avenue, Auckland.

Please send me full details of Lysaght's Barns and Sheds.

Name ....

Address ....

.... J.A./2

THE AUCKLAND FARMERS FREEZING CO. LTD.

AFFCo

Champion

the best stock foods

TESTS
AND
UNSOLICITED
TESTIMONIALS
PROVE THE
VALUE OF
OUR
PRODUCTS

AFFCO CHAMPION PIG MEAL

A mineralised meal of "quality" ingredients, providing the vital inorganic trace elements together with the important B-complex vitamins and vitamin E. A general purpose meal, both profitable and economical.

AFFCO CHAMPION DAIRY MEAL

Acclaimed by prominent stud stock breeders, town milk suppliers, and owners of herds of high production figures.

Stocked by—

Dairy Companies, Stock & Station Agents, Merchants.

Shell Announce
Delak No. 2

A balanced detergent for the DAIRY INDUSTRY

The Shell synthetic detergent, **TEEPOL,** has become identified with efficient industrial cleaning. As absolute cleanliness is essential to the dairy industry, Shell have taken a particular interest in this field and **TEEPOL** has become widely accepted.

Now, to save time in the measuring out of alkalis for use with **TEEPOL,** Shell have introduced a convenient, complete product in powder form — **Delak No. 2.**

Delak No. 2 (*and an informative leaflet*) is available from J. B. MacEwan & Co. Ltd. or your local dairy company in cartons of 5 pounds 10 ounces and bags of a hundredweight.

Delak No. 2 *TEEPOL plus ALKALI— a balanced detergent*

A SHELL PRODUCT

The Shell Company of New Zealand Limited (Incorporated in England) D1.3D for this, as at present prices it would pay handsomely to use meals to put on the few extra pounds of carcass weight needed to bring them within the 60-90lb. premium price range.

91-120lb.: These heavy porkers are not nearly as desirable as the lighter weight range and are not as profitable to produce. It is much preferable for producers instead of being forced to sell in this range to decide in advance how many of the pigs on hand can be carried on for a further 6 weeks (to take them to 130lb. at least). This will be governed by the other pigs following on and the likely food supply in that period. When the number which can be taken on has been decided all others should be marketed as convenient at between 80 and 90lb. carcass weight.

Supplementary Foods

If it proves necessary to supplement the food supply to be able to market pigs at suitable weights, there are two principal approaches:—

1. Provision of home-grown crops: This, of course, involves planning further ahead, but provided the job is thoroughly done, it will ensure a reserve of food for any period of scarcity at a lower unit cost than can generally be achieved by a policy of purchasing meals. (See Department of Agriculture Bulletin No. 343, "Crops for Wintering Pigs".)

With the exception of maize and barley, which are concentrated foods, most of the crops are fairly bulky. They can be used best for breeding stock, for providing a basis for restricted finishing of baconers with milk and/or meals, and for providing a cheap bulk ration for pigs which have to be wintered. The better-quality roots, such as sugar beet and fodder beet, can be used effectively at the end of the season with meals to supplement the ration and to get light pigs up to marketable light porker weight and in prime condition.

2. Purchase of meals: Because many North Island farmers on fully improved grassland farms have not the necessary equipment for crop production or are not experienced in it, they prefer to depend on purchase of meals. The economic use of meals, however, is fairly strictly limited and though, at present prices, it may, under certain circumstances, pay to feed meals quite heavily to lightweight pigs at the end of the season to get them up to marketable weights, the use of meals for fattening is generally regarded as uneconomic.

Much better results from the use of meal with milk are obtained if it is fed mainly in the following ways:—

In creeps to suckers.

To supplement the milk fed after weaning for a few weeks until weaners have sufficient size to make use of a full milk feed.

To sows to get them into good condition after weaning a litter or to prevent them being reduced to too low condition when suckling. When milk is short 2lb. daily of a high-protein meal should be added to the sow's ration for the last month of pregnancy.

Feeding for Carcass Quality

The producer of fat pigs should take care in the selection of his breeding stock, particularly the boar, to ensure that the foundation of carcass characters which are strongly inherited, such as body length, balance of side, and ham development, is soundly laid. In the main he depends on the breeder for improvement in these characters, however, and he must manage and feed his pigs intelligently to secure full expression of their inherent qualities.

Where pigs of the intermediate type most common in New Zealand today are used the main considerations, together with their practical application, are as follows:—

The three main tissues of body structure, bone, muscle, and fat, have different rates of development over the period of growth and maturity of the animal. Bone grows most rapidly in the early stages. Following this, muscular tissue develops most rapidly, and finally as maturity is approached the rate of deposition of fat increases.

The type of pig being considered will, if grown as rapidly as it can be under good management, reach an ideal proportion of lean to fat for present market requirements at about 90lb. carcass weight (130lb. liveweight). Proportionately more fat is permissible in the baconer carcass of 140-160lb. (190-220lb. liveweight), but this type of pig tends to put on fat more rapidly than is desirable after it has reached 130-150lb. liveweight. It has been found necessary to restrict the food intake in some manner to produce carcasses with ideal backfat cover. Incidentally this restriction of food usually results in better food conversion; in other words, more meat and better quality is produced from a given amount of food.

Good Start Essential

Whether the end product is pork or bacon feeding must be such as to allow maximum development of lean meat. The essentials underlying this are:—

1. The sow must have good milking ability and be healthy and in good firm condition when she farrows and thus able to give birth to good strong piglets.

2. The piglets must start taking extra food through the creep as early as possible so that they become well-grown strong weaners.

3. There must be no check at weaning. The quantity of meal fed in the creep must be increased temporarily at weaning; not less than 1lb. per pig per day should be in concentrate form at this stage.

4. The pigs should grow as fast as they will under conditions, including some outdoor exercise, which will maintain healthy tone right through to porker weight. There should be no store stage.

When pigs have reached 120lb. liveweight the foundation of lean on which those to be taken on to baconers have to build will have been laid. This full development of lean meat if not attained at this stage can never be built up later to the same extent no matter how careful subsequent management may be.

Variation of Type

There will probably be some variation of type in each line of pigs and it is well to go over them when they are at the 120lb. liveweight stage to sort out the shorter, earlier-maturing pigs. These should be sent off as porkers. It would place too great a strain on management to hold them back sufficiently in a pen with other, later-maturing-type pigs and they would inevitably become overfat if taken on to baconer weights.

Restricting Feeding of Baconers

All experimental work on the restriction of the ration of baconers in their later stages of growth has indicated the twin benefits of better use of food and better quality of carcass.

When C. P. McMeekan (now Superintendent at Ruakura) was carrying out his experiments on the growth and development of the bacon pig at Cambridge University he used four groups of pigs, two of which were started and taken to 16 weeks of age on a high plane of nutrition and two kept on a low plane at this stage, after which the treatment of one of each of these pairs of groups was reversed. The resulting treatments together with the pounds of food required per pound of gain over the period from weaning to slaughter are shown in Table 4.

TABLE 4—FOOD CONVERSION EFFICIENCY OF GROUPS OF PIGS ON DIFFERENT NUTRITIONAL TREATMENTS

Group	lb. food required per lb. gain (average from weaning to 200lb. liveweight)
High-high	5.05
High-low	4.28
Low-high	5.61
Low-low	5.17

The last group, which was grown very slowly, not only produced very unsatisfactory carcasses but lost the advantage of food saving. These figures show clearly that to obtain the best food conversion the rapid early growth accompanying a high level of nutrition over the early period is necessary. The high-low group were not only outstanding in feeding efficiency but in carcass quality.

In a recent trial with crossbred pigs in England 10 litter groups of 6 pigs each were subdivided equally, half the pigs of each group being allowed ad lib. feeding on dry meal from self-feeders and the other half a restricted diet of meal up to a maximum of 6lb. per head per day. Eighty per cent. of the self-fed pigs graded A whereas over 96 per cent. of the pigs on restricted diet reached the same standard, which, incidentally, was not as high as pre-war standards. Food consumption was lower by ¾cwt. per pig in the restricted group.

Trials conducted before the war by C. E. Ballinger at Ruakura showed that though only 40 per cent. of typical Tamworth x Berkshire pigs graded Prime No. 1 when on full feeding, the percentage could be increased to 80 per cent. and, in some cases, to 100 per cent. by reduction of the ration after pigs had reached 120lb. liveweight. This restriction gave substantial food savings and thus increased potential pig meat production.

Dieting Pigs

The practical application of these findings requires answers to such

TABLE 7—PRACTICAL RATIONS FOR RESTRICTED FINISHING OF INTERMEDIATE TYPE OF PIG

		Daily ration			
		Example 1. Fodder beet		Example 2. Mangolds	
Liveweight lb.	Food units daily	Skimmed milk gallons	Fodder beet* (20 per cent. dry matter) lb.	Skimmed milk gallons	Mangolds or grass* lb.
120	4¼	2½	12	3	12
140	4½	2¼	16	3	15
160	4¾	2	20	3	18
180	5	2	20	3	20
200	5	2	20	3	20
220	5	2	20	3	20

* If the roots are fed to appetite with these amounts of skimmed milk, the quantities stated will be roughly what would be consumed. If, on these rations, the rate of gain falls below 1lb. liveweight per day, the milk should be increased to achieve this rate of gain or, if milk is not available, meals should be used for this purpose.

questions as how early food must be restricted and to what extent to secure the necessary improvement in carcass quality to reach higher grade and therefore to command a higher premium; and how much longer the pigs have to be on the farm under restricted feeding. Since restriction means keeping the pigs below appetite level or lowering the total energy content of the food the animals will consume, some guide to the desirable feeding level, according to the weight of the pig, is necessary. Where a bulky food such as roots or grass can be incorporated in the ration this will assist in satisfying the pigs' appetite and stop them fighting at the trough.

Table 5 sets out total food units which should be allowed per pig per day with different types of pig from 120lb. liveweight onward to avoid overfattening and ensure good grading results.

The short-type pig is included, not because it is recommended to take it to bacon weight—it should be sold as a porker—but because of shortage of more suitable pigs it may be necessary to take some short-type pigs up to bacon weight. They should never be taken beyond 190lb. liveweight and even then on the lowest level of feeding shown in Table 5.

TABLE 5—RATIONS IN RESTRICTED FEEDING OF BACONERS

	Food Units per Pig per Day		
Liveweight (start of period)	Short-type (or intermediate type after winter store period)	Intermediate type (or bacon-type after winter store period)	Bacon type
120	4	4¼	4½
140	4¼	4½	5
160	4½	4¾	5¼
180	4¾	5	5½
200	5	5	5½
220	—	5	5½

Value of Roots in Ration

As litters containing pigs of varying sizes are normally carried on together on New Zealand farms, merely restricting the amount of food put in the trough to the quantities given in Table 5 would result in the fast eaters getting more than their share and the slower eaters, usually already the smallest pigs, being unable to maintain an economic growth-rate.

There are two approaches to this problem, which still exists to some extent even where pigs are sorted to uniform size. The first is provision of partitioned troughs so that individual feeding can be practised, pigs being rationed according to liveweight. This is not generally possible in ordinary commercial pig raising and the alternative—that of including some bulky feed in the ration—is usually the most practical solution.

The Lehmann system of feeding, which originated in Germany, used potatoes, of which there is frequently a surplus above human requirements in that country, as the bulky food. Young pigs are fed wholly on meal (70 per cent. barley and 30 per cent. white fish meal) after weaning until they are receiving 2¼lb. per day. After this cooked potatoes are introduced and gradually increased without any change in the basal ration of meal.

The feeding system has been put into operation successfully with varying combinations of meals and bulk foods, although when bulk foods other than potatoes, artichokes, or sugar beet are used, it is found desirable to increase the basal ration slightly to 2½ or 3lb.

In New Zealand the quantities of various foods which are accepted as being equal (1 food unit) are given in Table 6.

In practice the milk or meal which is required to balance the total ration containing foods in the right-hand column is slightly less than shown because although the foods in the right-hand column do not contain adequate protein, they do contain some which goes to make up the total content of protein in the ration. However, protein is usually not so scarce in New Zealand as to necessitate cutting it down to the bare minimum. A mixture of proteins from various sources is better than protein from one source, particularly if this is a vegetable source such as pea meal.

TABLE 6—EQUIVALENT FOOD VALUES FOR PIG FEEDING (Food Unit Equivalents)

Foods rich in protein

Concentrates

1 gal. (10lb.) skimmed milk or buttermilk
7/8lb. meat meal*
1lb. pea meal or linseed meal

Bulky Foods

10lb. grass, lucerne, rape or kale, chou moellier, etc.

The foods in the right-hand column require supplementing with one of the concentrates given above

The quantity of each **one** which will supply **all** the protein required is shown below:—

Size of animal	Skimmed milk gallons	Meat meal lb.	Pea meal lb.
Weaner	1	½	1¾
Baconer	2	1	3½

Foods low in protein

Concentrates

1½ gals. (15lb.) whey (when fed balanced with meat meal 1lb. to 5-10 gals. according to liveweight of pig)
7/8lb. maize
1lb. barley or wheat
1¼lb. pollard or oats
1½lb. bran

Bulky Foods

5lb. potatoes (boiled)
5lb. sugar beet
6lb. artichokes
7lb. fodder beet
8lb. carrots
10lb. pumpkins, swedes, or mangolds

* 60 per cent. protein

An example of restricted feeding—that for the intermediate type of pig—is given in Table 7. It sets out practical rations which though satisfying the appetite of the pig, will effect the degree of restriction necessary.

When root crops are not available pigs will make good use of pasture or lucerne grazed in the succulent stage, provided the milk feed is restricted to the level indicated. To capitalise fully on the advantages of restricted finishing of baconers it will be necessary to keep more pigs than have been put off under a full-feeding system. This entails keeping more sows and the growing of the appropriate crops. These should be planned to be available from April to assist in finishing off porkers before the end of the season and to winter those pigs which have to be carried right through to October or until grass growth is adequate to provide bulk greenfeed.

Chief Points

The chief points in production of high quality carcasses may be summarised as follows:—

1. Marketing conditions dictate the necessity to strive for the highest carcass quality in both porkers and baconers.

2. Certain carcass characters are strongly inherited and selection for high quality in these respects must be practised with breeding stock.

3. Backfat, on which commercial grading is largely based, is a factor which is capable of being controlled by feeding.

4. Early development of lean meat is essential in the production of quality carcasses of both porkers and baconers.

5. There should be no store stage, but from 120lb. liveweight the finishing rations for baconers must be controlled according to the type of pig being handled. Finishing weights at the lower end of any weight bracket used in grading standards will generally secure better grading results.

6. Careful management and practise of the higher art of feeding with keen observation by the farmer are essential to the production of uniformly high quality carcasses.

Turnips and Swedes for New Zealand Conditions

By J. O. WALLACE, Seed Production Officer,
Department of Agriculture, Dunedin

BEFORE the Second World War when New Zealand depended on the United Kingdom for her requirements of turnip and swede seeds, farmers were presented with a lengthy and frequently changing list of varietal names from which to draw their supplies. Some names appeared with regularity in practically all seedsmen's catalogues, but others appeared in perhaps only one catalogue for a year or so and then disappeared, to be replaced by some new names. The descriptions accompanying the names frequently gave no real clue to the important characteristics of the bulbs which might arise from the seed thus described.

AN investigation made during 1930 to 1933 revealed that a large number of the so-called varieties on the market at that time represented only a relatively few distinct types, and that many, if not actually synonyms, were so similar in character that they possessed no differences of real agronomic importance. This investigation (1) established that for all practical purposes the turnip and swede varieties then could be grouped into not more than 17 classes.

The investigation carried out in this country had its counterpart in a similar trial conducted in England from 1939 to 1943 with 51 strains of swedes. The published report (2) covering this trial made the following observation in regard to strain similarity: "It is obvious that many of the strains examined were very similar to one another from the agricultural point of view."

After the outbreak of war New Zealand met the threat of a shortage of turnip and swede seed imports by commencing a scheme of seed production under the supervision of the Department of Agriculture. The selection of types to establish the list of Government approved varieties was based on the report of the investigation mentioned above, the aim being to provide as wide a range as possible with the minimum number of varieties.

This scheme of seed production has been continued without interruption since 1940, though some additions have been made to the list of varieties as experience showed this to be desirable.

Today the needs of the New Zealand farmer are met by 6 varieties of swedes, 7 varieties of yellow-fleshed turnips, and 4 varieties of white-fleshed turnips. These varieties, their relative importance in New Zealand farming as indicated by the proportion of the total acreage devoted to each, and their pre-war imported counterparts are given in the following table:—

N.Z. Turnip and Swede Varieties and their Pre-war Counterparts

N.Z. variety	Proportion of N.Z. acreage per cent.	Pre-war counterparts
		Swedes
Superlative	14	Superlative, Masterpiece
Grandmaster	11	Grandmaster, Majestic
Crimson King	9	Crimson King, Elephant
Wilhelmsburger	5	Wilhelmsburger
Sensation	1	Sensation, Vilmorin
Calder	3	—
		Turnips
Purple Top Yellow	3	Purple Top Aberdeen, Scotch Purple Top
Green Top Yellow	4	Green Top Aberdeen, Scotch Green Top
Purple Resistant	2	Bruce, Won-o-won, Tammie Mackie
Green Resistant	3	Wallace
Waite's Eclipse	2	Waite's Eclipse, Renown
Victory Yellow	1	Green Top Yellow
Champion Hybrid	1	Dale's Hybrid, Fosterton Hybrid
Green Globe	32	Imperial Green Globe, Hardy Green Globe
Red Globe	5	Red Paragon, Lincolnshire Red Globe
Purple Globe	2	Purple Top Mammoth
York Globe	2	American Purple Top White Flesh

Colour photographs and descriptions of these varieties appear overleaf. Bulb colours tend to vary slightly with the conditions under which the bulbs have been grown. The bulbs for the accompanying illustrations were taken late in June from Southland crops, and because of a succession of hard frosts the colours are not as bright as might normally be expected.

Swedes

The swede varieties of which Government approved seed is available have a fairly wide range of maturity periods, and also differ in their adaptability to different climatic conditions. In general, they have no particular resistance to the various diseases that attack the crop; consequently clean land is important if good crops are to be obtained. With one exception (N.Z. Calder) they represent fairly closely the types included in the long list of varieties previously available from overseas.

N.Z. Superlative is the earliest maturing variety, and is popular with farmers in all swede-growing regions except where winters are severe. The bulbs are oval to tankard shaped and purple above ground level and the foliage growth is fairly upright. The flesh, yellow and of moderately hard texture, is regarded as of high quality and because of its texture is very suitable for wintering young sheep. For late feeding it should not be sown early or when needed it will be past its best condition for feeding. This variety is also popular as a winter vegetable.

N.Z. Superlative is probably not as subject to mildew and brown heart as are other varieties.

N.Z. Grandmaster comes next in order of maturity, and is popular in all swede-growing areas in both Islands. The bulbs are semi-oval, distinctly square on the shoulder, and tapering below ground level. The bulb above ground is reddish purple and the flesh is yellow and somewhat harder in texture than that of N.Z. Superlative.

N.Z. Grandmaster is favoured on heavier land and where the swede crop is required as winter feed for cattle.

N.Z. Crimson King is rather later in maturity than N.Z. Grandmaster and is preferred on thinner soils overlying stiff clay subsoils which have been well manured. It is most commonly grown on the rolling Southland country; also in wetter and higher districts of the North Island.

N.Z. Crimson King has tankard shaped bulbs with fairly straight sides, and the foliage has a purple tinge in it. The bulbs stand well out of the ground and often develop a decided lean. Skin above ground level is a glossy deep purple; flesh is a deeper yellow than that of other varieties.

The roots frequently develop hybrid nodules, which should not be confused with the swellings of club root, which they superficially resemble. When sown early or when the plants are unduly crowded it is common for very long necks or shanks to develop.

N.Z. Wilhelmsburger is distinctly later in developing than the other varieties mentioned and does not reach full maturity until late winter. It is therefore best kept for feeding when other varieties are going off in quality. The bulbs of this variety are round to slightly oval, and the foliage is very low growing. Above ground level the bulbs are green, sometimes developing a light bronze tinge. The flesh is yellow, crisp, and juicy. The variety is resistant to frost and will continue to develop under hard winter conditions.

Though not immune to attack by disease, N.Z. Wilhelmsburger appears to be tolerant to at least moderate attack by club root, and also reveals less wastage from dry rot than purple-skinned varieties. Thus though it is not a high yielding variety, its feeding value in late winter is not so impaired by disease, and its high dry matter content aids in making it easily the best swede for late winter feeding.

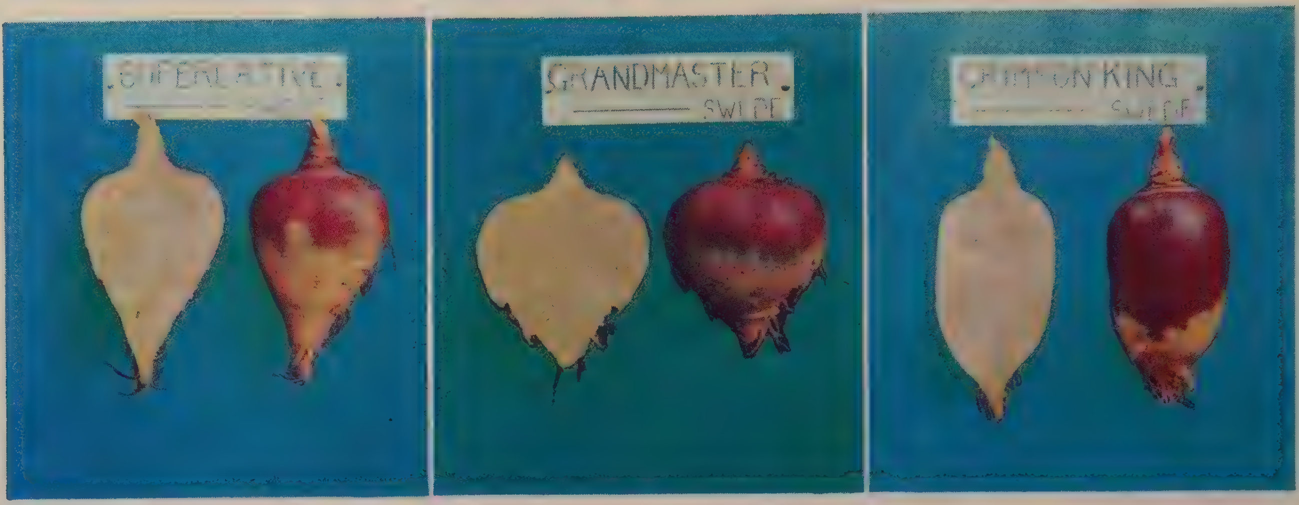
The variety is somewhat prone to brown heart, and when it is to be grown on soils of low boron status a pre-application of commercial borax or the use of a borated fertiliser is recommended.

N.Z. Sensation is a special-purpose swede for growing primarily in the drier areas. The bulbs are tankard shaped with long tapering roots which appear to aid the variety to withstand dry summer spells better than the shallow-rooted varieties. They are bright purple above ground.

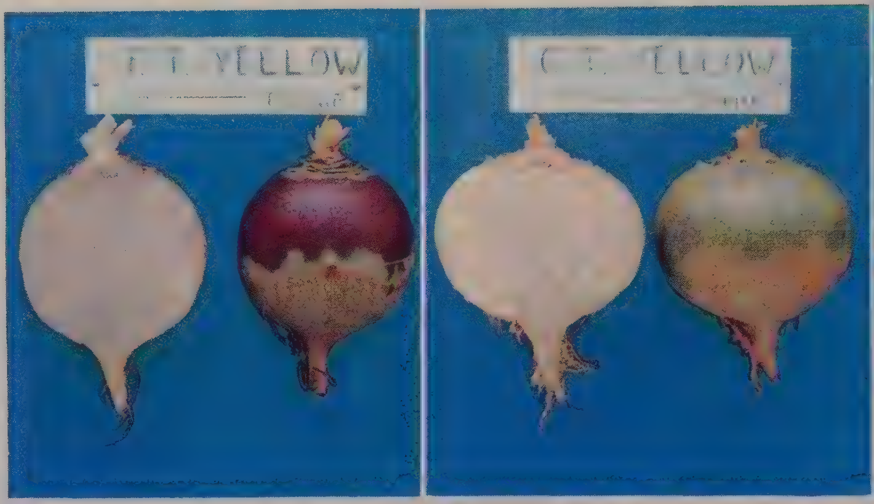
---

(1) "New Zealand Journal of Agriculture", vol. 51, Nos. 3, 4, 5.
(2) "Journal of the National Institute of Agricultural Botany", vol. V, No. 2.

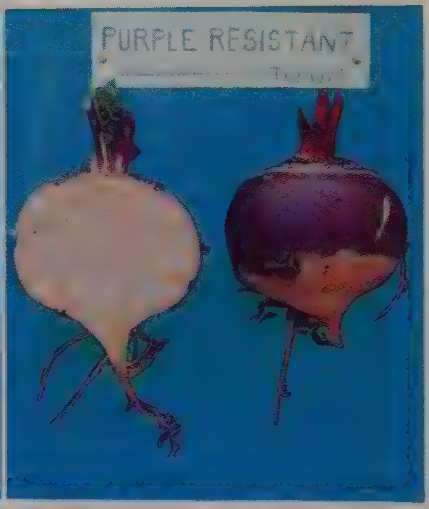
N.Z. GOVERNMENT APPROVED


SUPERLATIVE
GRANDMASTER
SWEDE
KING
SWEDE

Swedes in common use for general purposes.

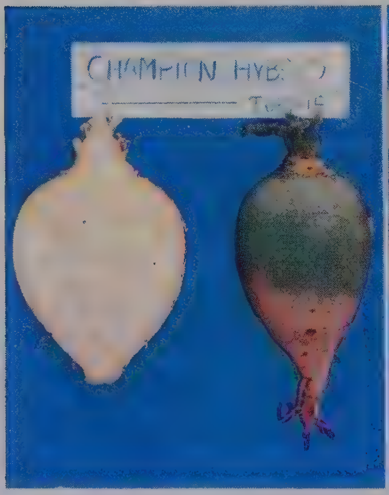

YELLOW
YELLOW

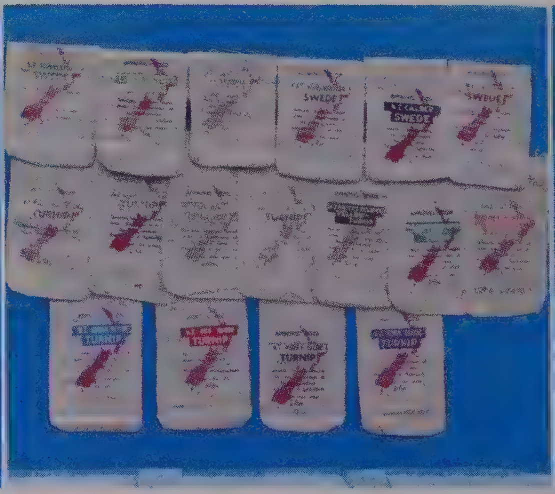
Hard, yellow-fleshed turnips for late feeding.


PURPLE RESISTANT

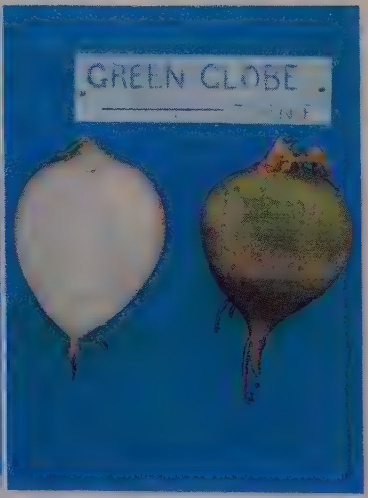
Club-root resistant, yellow fleshed.

Early maturing, yellow fleshed.

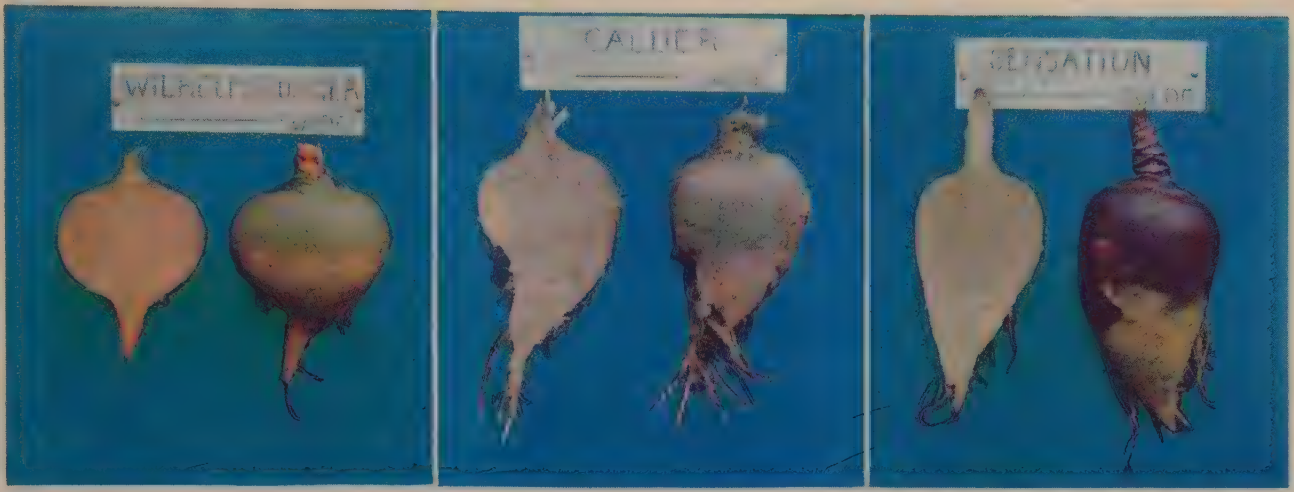

CHAMPION HYB
TURNIP


SWEDE
SWEDE
SWEDE
TURNIP
TURNIP
TURNIP
TURNIP
TURNIP

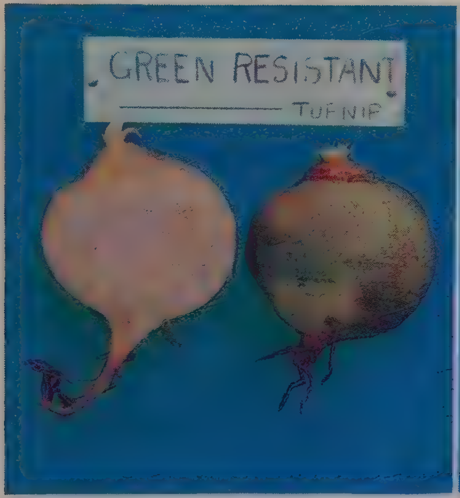
White fleshed.


GREEN GLOBE

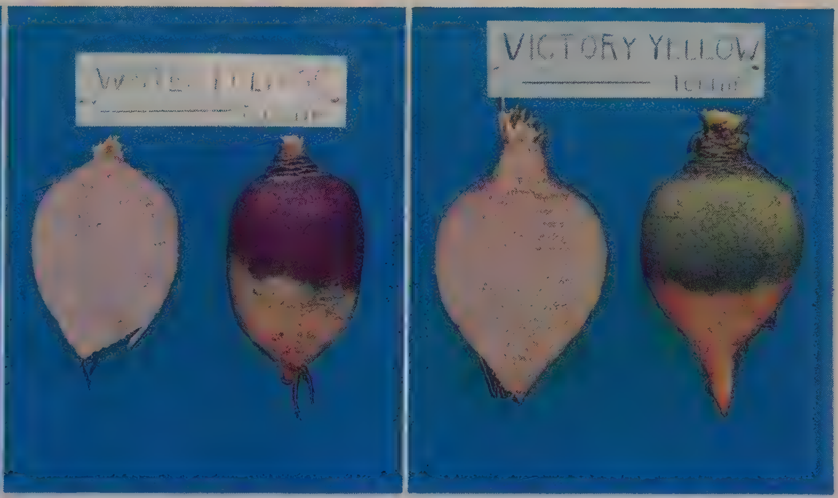
TURNIP AND SWEDE SEED


CALDER
SENSATION

Swedes suited to particular conditions.

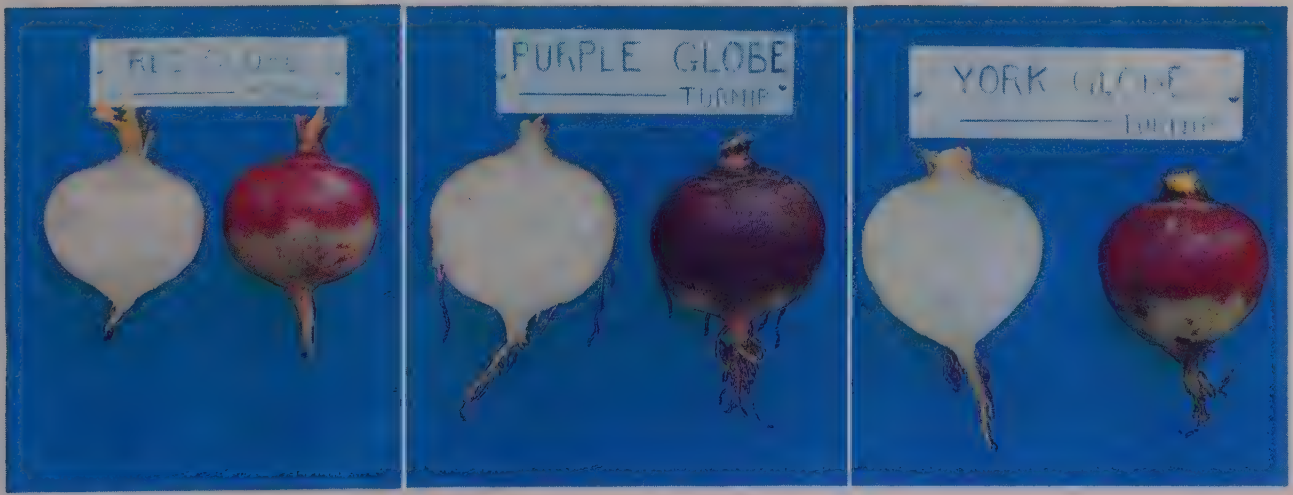

GREEN RESISTANT
TURNIP

Club-root resistant, yellow fleshed.


VICTORY YELLOW
TURNIP

Yellow-fleshed turnips of medium texture.

White-fleshed turnips of differing maturities.


PURPLE GLOBE
TURNIP
YORK GLOBE
TURNIP

Earlier selections were white fleshed, but the latest selection has a yellow flesh and lacks much of the fanginess of root characteristic of the original Vilmorin.

Sensation produces considerable foliage growth which is dark green with a distinct purple tingeing. It is prone to develop distinct necks on heavy land and under crowded conditions, but the top growth seems to be relished by both cattle and sheep.

The yellow-fleshed selection has been favourably reported on in trials in both the North and the South Islands.

The value of Sensation for drier conditions is increased by its resistance to aphis attack and also apparently to turnip mosaic.

N.Z. Calder is a variety bred by the Agronomy (now Crop Research) Division, Department of Scientific and Industrial Research, Lincoln, as an alternative to Sensation and has both Sensation and Grandmaster varieties in its parentage. The bulbs are tankard shaped and deep rooting, but lack the fanginess of Sensation. Above ground the bulbs are green, tending to bronze, and when exposed during winter in drier districts may appear reddish.

The foliage is lighter green and a little less vigorous than that of Sensation.

Though intended primarily for drier districts, Calder has been sown extensively and with some success in districts of higher rainfall. More experience is necessary before it can be recommended confidently against other varieties for such conditions, however.

Calder is resistant to aphis attack and also to turnip mosaic. It shows some resistance to mildew, and appears to be somewhat less susceptible to dry rot and club root diseases than are the purple-topped varieties.

Yellow-fleshed Turnips

This group of turnips takes its name from the colour of the flesh and of the skin below ground level. The varieties of this group are in general slower growing and of harder flesh than the white-fleshed turnip varieties, though different types vary considerably in both these characteristics. The harder-fleshed varieties keep well right through the winter, and in fact rival swedes in their keeping quality. The softer-fleshed varieties are faster growing but poorer keeping.

Yellow-fleshed turnips are rather exacting in regard to both soil and climatic requirements, and it is only in limited regions that they excel. They do best in a cooler climate and on a thin but well-manured soil overlying a stiff clay subsoil. This group of turnips will not tolerate the crowded growing conditions under which many swede and turnip crops are grown today, and if large, well-developed bulbs are required, the crop should be hand thinned and the soil drawn away from the plants rather than toward them.

N.Z. Purple Top Yellow is a good keeping variety of the type known before the war as Aberdeen or Scotch.

The bulbs are round, the skin below ground and the flesh are both deep yellow, and the skin above ground is purple. It is a very hard-fleshed, good keeping variety, popular on better class soils in cooler districts. Bulb development is very adversely affected by lack of growing room or by soil drawn up to the plants. The variety has a little resistance to club root.

N.Z. Green Top Yellow is very similar in all its characteristics to N.Z. Purple Top Yellow, except that the skin of the bulbs above ground level is green. This variety is considered by many to be the better keeper of the two.

N.Z. Purple Resistant and **N.Z. Green Resistant** are in appearance and behaviour similar to N.Z. Purple Top Yellow and N.Z. Green Top Yellow respectively. Their difference is revealed under conditions where club root disease attacks the crop, as both types reveal a marked resistance to this disease. For this reason they are commonly grown when a second crop of roots is required to follow swedes and club root is likely to be a determining factor in the success of the crop. They also require growing room if good yields are to be obtained.

N.Z. Waite's Eclipse is rather softer in the flesh than the yellow-fleshed varieties already described. The yellow of the bulbs is not so pronounced and the skin above ground level is purple. The bulbs are larger and stand out of the ground better than those of the Aberdeen types and have less root development. It also matures somewhat earlier, but keeps quite well. On account of its size and clean root, this is a good variety for pulling and feeding out during winter to winter-milking cows.

N.Z. Victory Yellow is similar to N.Z. Waite's Eclipse in maturity and hardness of flesh, but the bulb is semi-oval and has a green skin above ground. It also serves a similar purpose.

N.Z. Champion Hybrid is earlier in maturity and of poorer keeping quality than the other varieties of yellow-fleshed turnips. The bulbs are oval with the skin green above ground level. The flesh is paler and is more like that of a white-fleshed turnip in texture. It is a heavy cropper and is commonly used for earlier feeding and on the poorer soils in those regions where yellow-fleshed turnips are commonly grown.

White-fleshed Turnips

This group of turnip varieties is characterised by a white flesh and a white skin below ground level, which easily distinguish them from yellow-fleshed turnips.

They can be grown successfully over a wider range of soil and climatic conditions than can either swedes or yellow-fleshed turnips. They are also more rapid in their development, and a succession of sowings enables them to be used for feeding during late summer and autumn when pasture growth dries off. When they are sown in late summer their keeping qualities are comparatively good, particularly in the drier districts.

N.Z. Green Globe is the slowest growing and hardiest of the white-fleshed varieties and is the one most widely grown in New Zealand. It develops a globe-shaped bulb having a pale green skin above ground level and a firm flesh. It is a good cropper and if not sown too early will keep well into the winter.

N.Z. Red Globe is similar to N.Z. Green Globe, but the skin of the bulb above ground is red. It is earlier maturing, producing large bulbs suitable for autumn or early winter feeding. When sown early bulbs of this variety are valuable as a supplement to pasture in a dry late summer or autumn. N.Z. Red Globe is popular on the sharper and poorer soils.

N.Z. Purple Globe has purple skin above ground level, though occasionally bulbs are produced having a green-purple mottling. It is very similar in its appearance and utilisation to N.Z. Red Globe, but may be a shade earlier in reaching maturity.

N.Z. York Globe in some respects resembles N.Z. Red Globe in appearance, with its globe-shaped bulbs red above ground level. Though not a heavy cropper, it is the most rapid growing of all varieties. Its foliage is low growing and rather sparse. It cannot compete with other varieties of white-fleshed turnips for spring sowing, but when autumn-sown makes rapid growth. Bulbs from autumn sowings also keep well.

N.Z. York Globe is favoured for late sowings, such as when failure of an earlier sowing of another variety has occurred, when the weather has held up sowings unduly, or after a grain crop. It is also the best variety to include in a pasture mixture, as the foliage has not the same smothering effect on grasses and clovers.

Seed Supplies

Supplies of Government approved turnip and swede seeds are distributed to the New Zealand seed trade in 1lb. and 2lb. distinctly printed calico bags. The distributing firm is responsible under departmental supervision for the growing of commercial seed supplies from nucleus stocks raised by the Department of Agriculture. Cleaning, blending, and packeting of the seed are also done under departmental supervision, and the bags are sown with a lockstitch after filling and stamped with a departmental stamp. In this way users are assured of receiving genuine seed of the varieties described and illustrated in this article.

Sheep-carrying Capacity Trials at Winchmore

By G. K. McPHERSON, Irrigation Research Officer, Department of Agriculture, Ashburton

CONSIDERABLE local interest has been shown in a sheep-carrying capacity trial at the Department of Agriculture's Winchmore Irrigation Research Station and more emphasis has been placed on certain aspects of the trial than the facts warrant. The Winchmore Farm Advisory Committee, who have planned and supervised the trial, feel that the publication of a summary of the results to date is desirable.

Ewe flock on one of the fields in the trial area at Winchmore Irrigation Research Station.

THE trial was established to determine the potential fat lamb production from irrigated pastures, and to date it has aimed at maximum ewe-carrying capacity with winter supplementary feeding provided by winter-saved grass and hay. The area of the trial is 27 acres and the pastures were sown down in March 1949 with the following mixture: Perennial ryegrass 15lb., short-rotation ryegrass 15lb., cocksfoot 5lb., timothy 5lb., Montgomery red clover 2lb., white clover 2lb., and subterranean clover 2lb. per acre. Two tons of lime were sown on the cultivated land and 2cwt. of superphosphate per acre were sown with the seed. Subsequent topdressing has been at the rate of 2cwt. of superphosphate per acre per year. Irrigation has been based on the standard 3-weekly roster and varied to suit weather and irrigation requirements. The trial area was initially divided into three 9-acre fields and subsequently further subdivision has been carried out and there are one 5-acre and one 4-acre fields, four fields of 2¼ acres, and three fields of 3 acres.

Feeding

Intensively managed pastures have provided the feed for ewes and lambs. Each year about 15 acres have been closed in rotation from late February to the end of March, irrigated, and held for rationed winter and early spring feeding. Hay has been saved and used for winter feeding. Details of hay and silage harvesting and usage are:—

Year	Hay baled	Silage made	Hay fed	Hay ruined by weather	Hay brought in
	number of bales	tons	bales	bales	bales
1949-50	380	nil	231	75	nil
1950-51	263	nil	200	263	263
1951-52	132	20 (estimate)	254	nil	nil
1952-53	338	nil	198	164	9
Total	1113	20	883	502	272

As the trial has been of an exploratory nature, the Advisory Committee decided that hay lost in the 1950-51 season could be replaced and in the 1952-53 season authorised the purchase of up to 100 bales. To the end of July 1953 a total of 272 bales of hay produced outside the 27-acre trial area has been used.

Carrying Capacity

The trial began in the 1949-50 season, when 90 ewes were carried on the 27 acres, and ewe numbers have now been increased to 189. The progress of carrying capacity and lamb fattening is as follows:—

Year	Ewes per acre	Lambing	Lambs off mothers	Prime lambs	Seconds	Culls	Av. wt.	Lamb deaths	Ewe deaths
		per cent.	per cent.	per cent.	per cent.	per cent.	lb.	per cent.	per cent.
1949-50 ..	3.3	105	67	100	0	0	33.3	1.0	1.0
1950-51 ..	4.4	120	56	100	0	0	37.0	1.5	1.0
1951-52 ..	6.6	123	20	89	11	0	32.0	2.3	3.0
1952-53 ..	7.0	124	0	80	11.5	8.5	31.4	5.1	3.7

Lamb Meat and Wool Production

Production of lamb meat and wool for the seasons 1949-50 to 1952-53 is as follows:—

Season	Ewes per acre	Total lamb meat	Lamb meat per ewe	Lamb meat per acre	Total wool	Wool per ewe	Wool per acre	Wool growth
		lb.	lb.	lb.	lb.	lb.	lb.	months
1949-50	3.3	3130	34.8	116	1268	14.1	47	15
1950-51	4.4	5260	43.9	195	998	8.3	37	11
1951-52	6.6	6975	38.7	258	1890	10.5	70	12
1952-53	7.0	6799	36.0	252	2038	10.8	75	13

Experience in this trial has followed general experience in heavily stocking dominant perennial ryegrass-white clover pastures with ewes alone. Lamb fattening in the first two seasons presented no problems, but in the third and fourth seasons difficulties were experienced. The third season (1951-52) was locally generally good for lamb fattening, but the trial lambs were slow to fatten. The fourth season (1952-53) was not a good one for early lamb fattening either in the trial or generally in the district.

The Advisory Committee is now considering possible variations in management which may allow more satisfactory exploitation of intensively managed irrigated pastures, for example, limitation of ewe numbers and the progressive taking up of increased carrying capacity with cattle, summer supplementary feeding of lambs, and a change of pasture type from perennial ryegrass to short-rotation ryegrass.

Progress Results of Trial

The outstanding result of the trial to date has been the demonstration of the management methods for securing saved grass for winter and spring feeding. Further, the results from the stock management methods adopted, though they have not so far indicated a grazing system suitable for general adoption, have at least indicated a possible potential in stock-carrying capacity for intensively managed irrigation pastures.

It has been decided that the trial should be carried on for the coming season at the present rate of stocking. At the end of April the results of the present season will be reviewed and the future policy of the trial then determined.

GUARD

THE FUTURE

OF YOUR

CHICKS

WITH THE

NEW

POULTROL

at the NEW

REDUCED PRICE!

The first few months of a chick's life are most vital to its future development. A diet inadequate in Vitamins hinders its progress, increases susceptibility to disease, retards growth and without doubt reduces later egg production.

Don't take chances at this critical stage of development; add Poultrol every day to the diet of your chicks. The Vitamin Content of Poultrol never varies, because it is standardised by continuous laboratory control. Every pound of Poultrol is guaranteed to contain 1,000,000 units of Vitamin A and 100,000 units of Vitamin D3. It's double-strength, clear, smooth, easily assimilated and available either as Oil or Emulsion.

Keep the mortality rate down and ensure a healthy, productive life for your chicks.

FEED THEM

POULTROL

DOUBLE STRENGTH

NOW!

OIL OR EMULSION

Safest FOR ALL STOCK

Three times more powerful, germicidally, than pure carbolic acid Dettol, as supplied to the Royal Veterinary College, London, has many advantages. Use Dettol for the cleansing of wounds; as a lotion in suppurative conditions; for vaginal irrigation; for the routine disinfection of udders; for sore and cracked teats. Dettol is gentle and safe on the tenderest tissues, and most agreeable to use.

'DETTOL'

THE MODERN ANTISEPTIC

Obtainable in one gallon tins from your Chemist, Veterinary Club, or Stock and Station Agent.

Reckitt & Colman (New Zealand) Ltd., Pharmaceutical Division, Bond Street, Dunedin.

DAIRY FARMERS

MAINTAIN PERFECT VACUUM UNDER ALL CONDITIONS WITH . . .

'RUAKURA'

VACUUM

REGULATORS

"Ruakura"
VACUUM REGULATOR
INCHES 15 MERCURY

Superseding orthodox type relief valves "RUAKURA" Vacuum Regulators hold vacuum at a stable, constant level—giving maximum yield and faster milking without injury to delicate udder tissues.

Vacuum is Factory set and sealed on precision apparatus approved by the Department of Agriculture and is guaranteed to meet their standards as laid down in their Bulletin No. 260 on Mechanical Milking.

Order from your milking machine maker, or other supply house, specifying the setting required.

(Regulators are available for 10-16 inches of mercury.)

PRICE 63/- each.

Manufactured by Plastic Products Ltd., Hamilton, New Zealand.

Avian Leucosis or Fowl Paralysis

By J. J. THOMPSON, Veterinary Research Officer (Poultry), Department of Agriculture, Wellington

IN New Zealand, as in many overseas countries, avian leucosis (fowl paralysis) is responsible for up to 40 per cent. of the total number of birds lost by commercial and household poultry keepers. It is safe to say that from 10 to 15 per cent. of birds reared in New Zealand are affected by this disease; the mortality in individual flocks ranges from 3 to 80 per cent.

IT is obvious that this disease is the most serious disease affecting the poultry industry generally and that in a number of instances each year it is responsible for crippling losses.

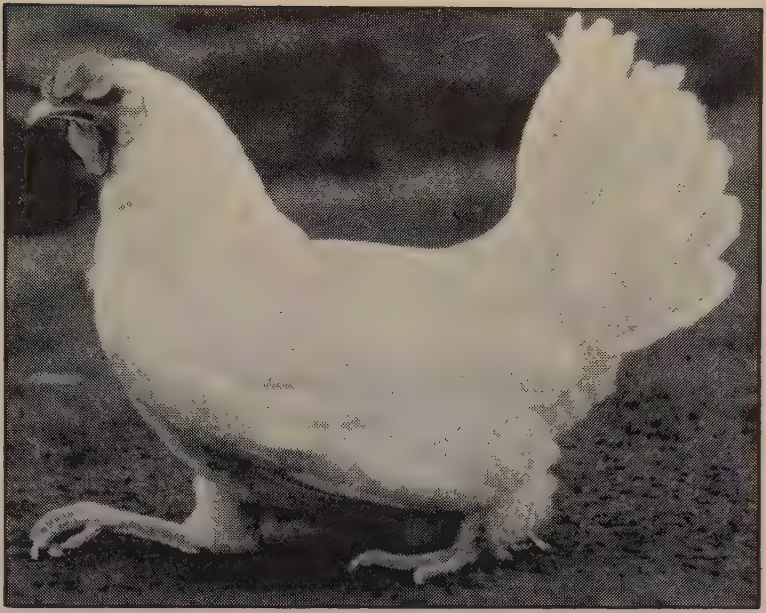
The widespread nature of leucosis and the loss resulting from it have familiarised most poultry farmers with the predominant features of the disease, particularly when it involves the nerves of the leg or wing, causing lameness or dropped wing. These features have led to the popular term fowl paralysis, but this is only one manifestation of the leucosis complex. The term complex is used here to indicate a group of apparently unrelated conditions produced by a common cause. Initially the disease is caused by a virus. The feature common to all the conditions is the abnormal accumulation of lymphocytes or white blood cells in different parts of the body due to an upset of the blood-forming cells.

Forms of the Disease

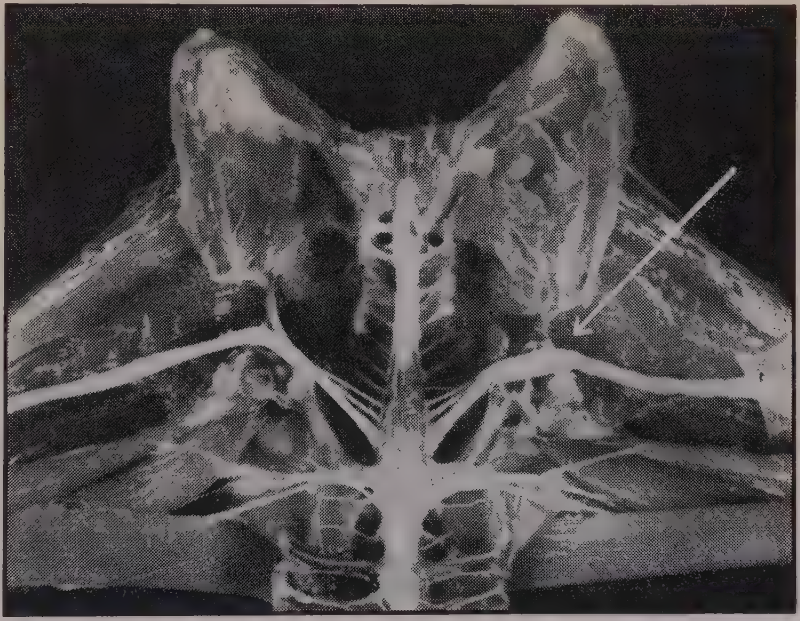
The form of the disease is governed by the area in which the abnormal cells gather.

1. **Nerves** (fowl paralysis): The affected nerve becomes enlarged and swollen, leading to paralysis of the part affected—leg, wing, or neck. Fowl paralysis is the most commonly observed symptom of leucosis.
2. **Visceral** (big liver disease): The internal organs are infiltrated by large numbers of abnormal cells with the formation of tumours or enlargement of the organs. The liver is particularly liable to be affected, becoming grossly swollen to many times its normal size.

   Tumours in the spleen or intestines are also common. This type usually causes wasting, diarrhoea, and sometimes dropsy.
3. **Eye** (pearly eye): The eye is invaded and the iris loses the colour characteristic of the breed of fowl, becoming faded and grey. The pupil, which is normally circular, becomes irregular in shape and blindness usually follows.
4. **Bone** (marble bone): The bones, particularly the long bones of the legs, become enlarged and thickened.
5. **Blood** (anaemia): This occurs in several types, but frequently is evidenced by wasting, shrivelled combs, and anaemic appearance.



Above—Fowl paralysis. This bird is unable to use its right leg and its toes are folded in. Below—Dissection of the same bird, showing the enlargement of the nerve of the affected leg (indicated by the arrow).



Leucosis infection is contracted by chickens during the period from the time they hatch until they are 8 weeks old, mainly during the first 3 weeks, although the symptoms of the disease do not normally show up until a bird is 4 to 9 months old. The period just before or immediately after birds begin to lay is usually the time of greatest loss from leucosis.

Egg transmission, according to some authorities, plays very little part in carrying on infection to the chicks. As the age of the bird increases, resistance to infection—the so-called age resistance—is strengthened. Other forms of resistance to leucosis which are of importance are evident in certain breeds and strains within breeds. Thus although White Leghorns as a breed are more susceptible than Australorps, strains of the former can be bred for high resistance to leucosis.

Recently, however, it has been claimed that surviving birds remain carriers and that egg transmission must be taken into account.

POULTRYKEEPERS!

Prevent Disease and Increase your Profit

World Authorities on Poultry Diseases are regarding the re-used fabric sack as a highly-probable source of infection. In Belgium, for example, the use of fabric sacks is prohibited entirely; and an eminent American scientist says there is no practical way of effectively sterilizing used fabric sacks.

When sacks are collected from other poultry yards they may have been contaminated with the germs of Fowl Paralysis; White Diarrhoea; and Coccidiosis. Those devastating diseases may then be delivered direct to YOUR birds through their food.

But there is now no need for you to expose your flock to this risk. Pure, hygienic Bates Multiwall Paper Bags are made to contain 20lb., 50lb. and 100lb. lots so whether you keep a few backyard birds or run a farm with thousands, it will pay you to

Insist on having Poultry food in

F P
MANUFACTURED BY
N.Z. FOREST PRODUCTS LTD
AUCKLAND
TO
BATES ST. REGIS SPECIFICATIONS

BATES MULTIWALL

PAPER BAGS

Manufactured to Bates-St. Regis Specifications.

AN N.Z. PRODUCT — FROM PINE TO PACKAGE.

Further particulars from N.Z. FOREST PRODUCTS LTD.,
(Multiwall Bag Division), Penrose, Auckland.

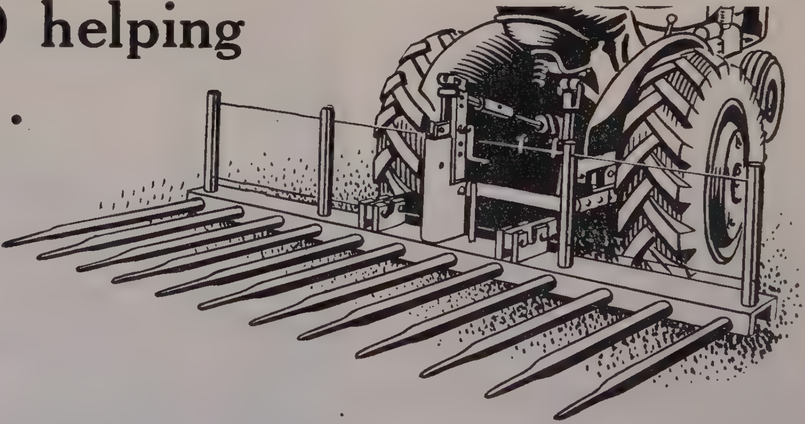
Bates Multiwall Paper Bags are light, strong and hygienic—pure as the virgin pine from which they are made.

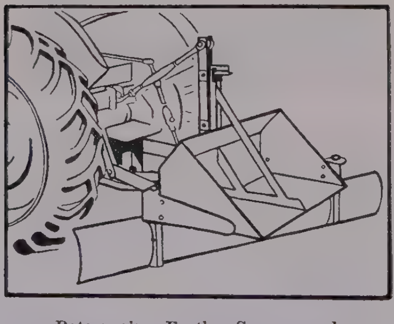
Bates Multiwall Paper Bags are leakproof. They resist dust, dirt and damp and keep the food in excellent condition. They are easy to carry; they stack neatly and empty cleanly, without the contents clinging. And Bates Multiwall Paper Bags are made throughout in New Zealand—from Pine to Paper at Kinleith—From Paper to Package at Penrose.

More than 1,000 helping N.Z. Farmers . . .

the new PATERSON BUCKRAKE is undisputed leader

PRICE £39 main ports





Paterson's Earth Scoop and Levelling Blade (illustrated above) is used for digging silage pits, repairing road, tracks—has a host of usefulness round the farm.

Rex Paterson, who owns 35 Ferguson Tractors, has designed a Buckrake Travelling Catch for specially rough work. This takes the load off the hydraulics altogether. Travelling Catch: 31/4 extra.

All-purpose hydraulically operated lifter for any tractor fitted with 3-point linkage — Silage, sacks, sheets, hay, fencing equipment — almost anything can be moved quickly and without backbreaking lifting — Average load with 12 tines: approximately 5/6 cwt.

RELIABLE SERVICE EVERYWHERE

ANDREWS & BEAVEN LTD

Head Office: Moorhouse Avenue, Christchurch.
Branches at Ashburton, Timaru, Invercargill,
Wellington, Auckland.
Agents throughout New Zealand.

A very important feature which has been noted is that the amount of virus or degree of infectivity carried by surviving birds gradually declines as they get older and by the time they are 1½ years old practically no infective virus is produced. Birds raised from pullets' eggs are much more likely to suffer from leucosis as the result of egg transmission than are the progeny of hens' eggs. The risk of leucosis is said to be about 25 times greater when pullet eggs are used for breeding.

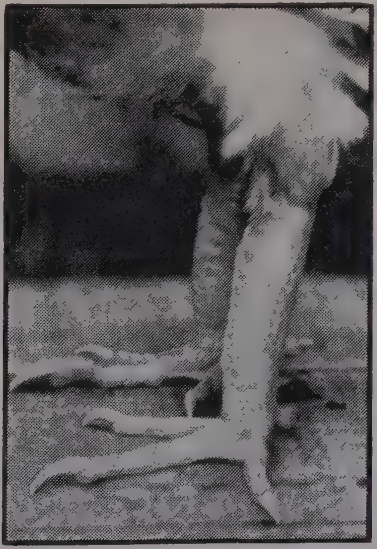
Although there is conflict of opinion regarding the importance of egg transmission, the increased resistance in older birds and reduction in the risk of 2-year-old birds passing on infection through eggs greatly favour breeding from hens instead of pullets.

Control measures for leucosis are based on the period at which infection takes place and the existence of genetic resistance in certain families.

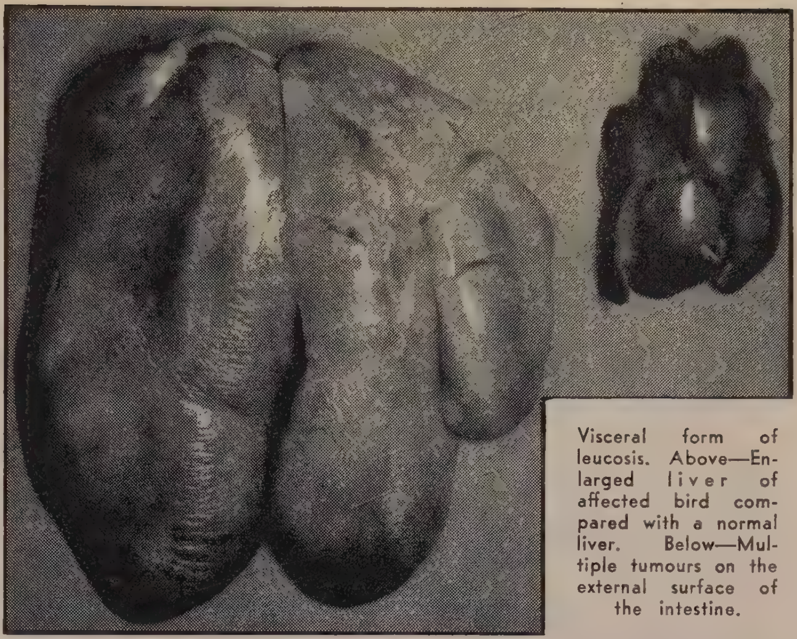
Predisposing Factors

Resistance to leucosis does not necessarily mean that birds which are able to survive have not been infected. Highly resistant birds which have withstood severe exposure to leucosis may break down later when other conditions weaken the natural resistance. The flock must be kept under good conditions and be fed well. Intestinal coccidiosis, a heavy worm burden, or deficient feeding will all augment and aggravate the onset of leucosis in the flock by their effects on the birds. Natural resistance must be supported in the fight against leucosis by good management and environment.

Myxomatosis, a rabbit virus disease similar in some respects to leucosis, has recently been used as a method of controlling rabbits. It is spread rapidly by mosquitoes and other blood-sucking parasites, and it is possible that leucosis is similarly spread by parasites of this type. Red mite and fleas can be responsible for transmission of leucosis from bird to bird, especially among young chicks.



Thickened shanks of bird with marble bone form of leucosis.

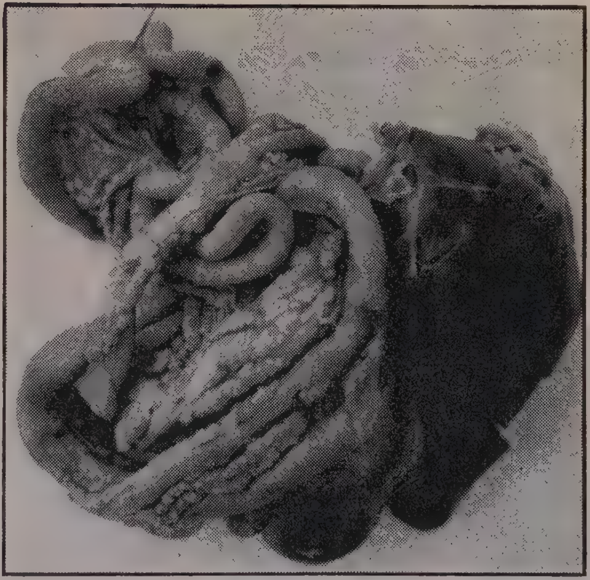


Visceral form of leucosis. Above—Enlarged liver of affected bird compared with a normal liver. Below—Multiple tumours on the external surface of the intestine.

Control

All efforts at curative measures have failed despite the administration of a large variety of drugs, vitamin preparations, and other medicines. Up to the present the experimental use of vaccines as a control measure has not met with success. In the event of an outbreak the only action which can be taken is severe culling of any birds showing signs of the disease.

Affected birds seldom recover and to continue feeding them is uneconomic. They also serve to increase the degree of infection on the farm.



Control of leucosis is possible by isolation of chicks and by breeding resistant stock.

Isolation Method

Complete: The complete isolation of young chicks from time of hatching until they are 5 to 6 weeks old has been amply demonstrated as a very successful method of ensuring freedom from losses through leucosis. The method entails not only a separate farm or rearing range, but separate equipment, housing, and attendants. It is therefore outside the scope of most poultry farmers in New Zealand.

Partial: Comparative freedom from loss is possible by partial isolation. Chicks raised from the day-old stage to 3 weeks old at a distance from older birds may pass through the highly susceptible stage with the minimum of exposure to the disease. The greater the distance between brooder house and laying houses the more successful the results will be; a distance of 100ft. from adults is much superior to say 20 or 40ft. A separate attendant for the brooder house or, if that is not possible, the changing of boots and overall by the attendant before he enters the brooder house will increase the degree of freedom from exposure to infection.

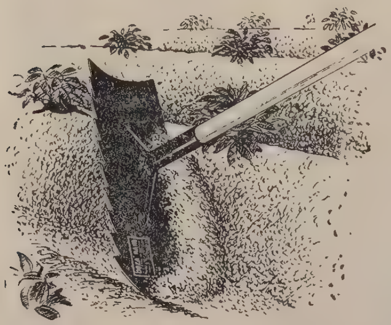
Unfortunately many brooder houses are placed very close to laying houses, but on farms where new brooder houses are to be erected or where alterations can be carried out, the value of wide separation of brooder house from adult birds should be kept in mind.

DOZA NON-CLOG RAKE

It is a rake, hoe, grubber, scoop, hole digger, trencher and SCRAPER.

4 types

Farmers—the heavy-duty DOZA can do a hundred jobs for you in the cowshed, pigsty, woolshed or garden.



Illustrated is the Model D, with one rake side, one scraping side, and hoe tip, moulding potatoes.

Available from your local retailer or direct from

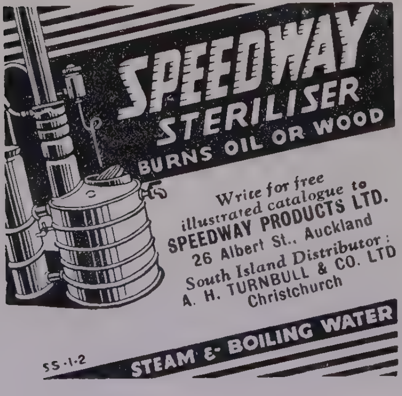
Agricultural & Commercial Engineering Co. Ltd.

3 Gordon Place, Newtown, Wellington

NEW ANTI-RUST AGENT!

IN "3-IN-ONE" OIL

NEW discoveries have now made "3-IN-ONE" Oil better value than ever! New rust-inhibiting agent, more penetrating power and greater "oilyness" make "3-IN-ONE" Oil the ideal lubricant and rust inhibitant for home, office, workshop and garage. For ***complete*** protection — buy a can today! B 3—1



SPEEDWAY STERILISER
BURNS OIL OR WOOD

Write for free illustrated catalogue to
SPEEDWAY PRODUCTS LTD.
26 Albert St., Auckland
South Island Distributor:
A. H. TURNBULL & CO. LTD
Christchurch

STEAM & BOILING WATER

SS-1-2

CERTAINLY
Made a Difference to my Production

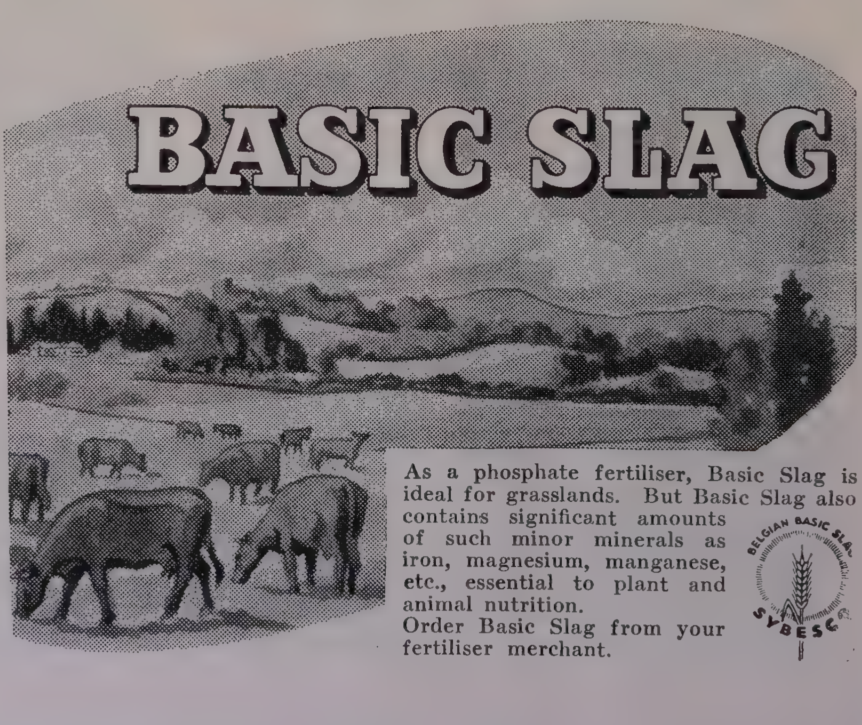
A SIGMUND RAINMASTER can assure you, too, of greater profits, improved pasture, and better all-year-round productivity. This unique OVERHEAD SPRAY IRRIGATION SYSTEM spreads a fine curtain of spray over a wide area, irrigating at the rate of 1in. of rain per acre in 50 minutes. NOW is the time to consider its application to YOUR land for the coming season.

B. R. HOMERSHAM LTD.

Dominion Agents:
Irrigation Counsellors on all pumping and water distribution requirements.
126 VICTORIA STREET, CHRISTCHURCH. - - P.O. BOX 280.
Agents throughout New Zealand.

It pays to fertilise with . .

BASIC SLAG



As a phosphate fertiliser, Basic Slag is ideal for grasslands. But Basic Slag also contains significant amounts of such minor minerals as iron, magnesium, manganese, etc., essential to plant and animal nutrition.

Order Basic Slag from your fertiliser merchant.

BELGIAN BASIC SLAG
SYBESC

Breeding Methods

Progeny testing: Resistant strains of birds which will stand severe exposure to leucosis with little loss have been established by progeny-testing methods. This procedure, however, requires facilities not possessed by the average poultry farmer. If such strains could be established in New Zealand by experimental stations, it is possible that breeding genetically resistant cockerels for use in poultry flocks throughout the country would raise the general flock resistance to leucosis.

Work of this nature is already being carried on at the Poultry Demonstration Plant, Upper Hutt, with the use of both White Leghorns and Australorps. The influence of the resistant male may easily be lost through haphazard mating, and a scheme of this type would obviously require careful planning.

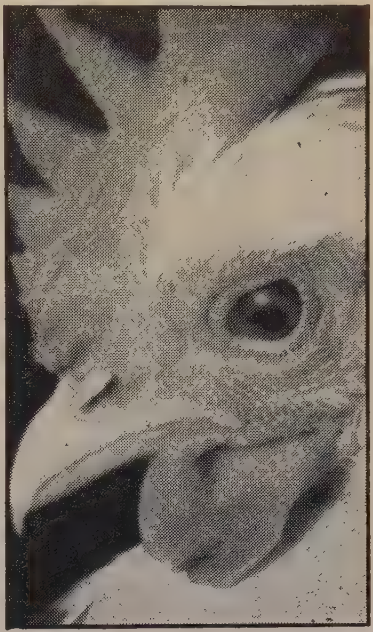
Mass mating: Good results can be obtained under normal mass-mating conditions by breeding only from hens and avoiding pullet breeding. Birds which have survived to the age of 2 years or more have at least shown some resistance to the disease, which has eliminated more susceptible birds up to the age of 18 months. These older birds may transmit some of their genetic resistance to leucosis to their chicks. Recent work has shown the risk of egg-transmitted leucosis to be many times greater in the progeny from pullet eggs compared with that from hen eggs.

The use of hens in preference to pullets for breeding as a means of reducing the incidence of leucosis is further strengthened if cock birds are used instead of cockerels. In recommending cock birds it is appreciated that certain practical and economic issues are raised. Among these are the practical difficulties of holding male birds from one breeding season to the next and the cost of feeding such birds during this period. Breeders have also to face the fact that fertility may be lowered by use of older male birds. Against these possible adverse economic factors, breeders must place the increased chance of reducing losses from leucosis, which can have a devastating effect on the egg production of annual pullet replacements.

Consequently it is recommended that breeders consider the following policy: A selection should be made of the best hens available on the farm, and these should be set aside for matings to provide, first and foremost, replacement pullets for the breeder himself. These best breeding hens should be mated to cock birds in an endeavour to establish the maximum constitution in the breeders' own stock and to build up improved resistance to leucosis. If it is considered impractical to mate the entire flock of best hens with cock birds, the breeder should mate at least a proportion of these hens to cock birds annually. The chicks from this mating should be toe-punched so that the best male birds may be retained from these matings each year. The increased chances of improving stock in leucosis resistance, general constitution, and liveability by this policy far exceed the increased costs associated with using mature tried and tested cock birds.

The effect of indiscriminate pullet breeding on the health of the general flock is now well recognised, and the present Flock Improvement Plan, by its insistence on breeding from healthy, mature adult birds, has done much to reduce disease loss.

Probably the greatest safeguard against loss from leucosis which is within the scope of the average breeder is a combination of isolation of chicks up to the age of 3 weeks and a breeding programme which makes use of hens and cock birds as far as possible. These measures must be supplemented by good management, sound feeding, and good housing.



Pearly eye form of leucosis. The pupil, normally circular, is irregularly shaped.

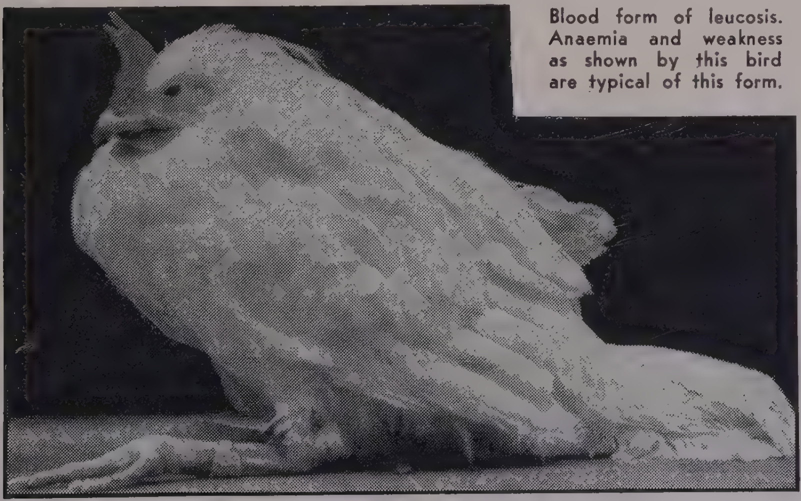
If a small proportion of the chicks are reared close to the adult birds, allowing reasonable exposure to infection, the subsequent percentage mortality from leucosis will indicate the degree of resistance being built up. It would be misleading to attempt to judge the resistance of a flock by observing the survival rate of chicks reared in isolation and therefore only lightly exposed to infection.

The control of leucosis is of importance to all poultry farmers in New Zealand. The Department of Agriculture is keen to assist all efforts toward establishing flocks resistant to the disease, and any breeder who contemplates carrying out changes in his normal methods of management with this object in view should discuss the project fully with the local Poultry Instructor.

Summary of Control Measures

1. Control of leucosis is possible by isolating chicks until they are 3 weeks old and by breeding genetically resistant strains.
2. With the use of mass mating methods, benefit results from breeding from older birds.
3. Environmental conditions such as feeding, management, and housing can exercise a significant influence on losses from leucosis. Red mite and fleas may spread the disease from bird to bird on the farm.

Laboratory examination is often required to establish a reliable diagnosis of this condition, and in the event of loss affected birds should be forwarded to the Department of Agriculture's Animal Research Station, Wallaceville, accompanied by a letter giving details of the losses and the symptoms noted. Advice of the local Poultry Instructor should also be sought.



Blood form of leucosis. Anaemia and weakness as shown by this bird are typical of this form.

Farm Piping THE EASY WAY

You owe it to yourself to investigate any new development that will save time and reduce maintenance costs on a farm. Get to know more about Contour Pipe for instance. It's plastic, flexible and almost indestructible—the very latest development in water and skim milk reticulation.

Contour Pipe can be joined simply by butt welding from the heat of your blow lamp, threaded or adapted to take compression fittings for linking to existing runs. Due to ease of laying and unlimited life, installed cost is less than any other pipe. It can be laid at speed behind a mole plough or trenched in the normal manner. It comes in 50, 100, 200 and 500 foot coils.

"GARNITE"

CONTOUR PIPE

registered trade name of the "A'kathene" Piping, manufactured by the PLASTICS DIVISION of the N.Z. GLASS MANUFACTURERS CO. PTY. LTD.

RING YOUR NEAREST STOCK & STATION AGENT OR WRITE TO SOLE SELLING AGENTS, NEILL, CROPPER & CO. LTD., Box No. 74, P.O., AUCKLAND.

Increase yield from crops and pastures—

spray with

stantox

P-44 and 64

STANTOX 64. Weeds may be costing you more than you think — severely reducing crop yield, draining the productive value of the soil, and hampering harvesting. STANTOX 64 is a hormone weed-killer specially developed for control of weeds infesting wheat, oats, barley and similar crops. By ensuring a clean crop, it increases the yield and improves your profit . . . *and it's still the most economical weed-killer on the market.*

STANTOX P-44. Are weeds reducing the carrying capacity of your pastures? Spray with STANTOX P-44, a hormone weed-killer specially prepared for control of hard-to-kill weeds, and enjoy bigger profits from clean pastures. STANTOX P-44 does not injure stock or grass, clears weeds leaving a thick, luxuriant growth. Get weed-free pastures for less cost with STANTOX P-44 . . . *still the most economical hormone spray on the market.*

Please send me information on Weed Control in

Crops.............................. Weeds......................

Pasture Weeds ....

Name ....

Address ....

Contact your nearest STANTOX agent for advice and service. Spray equipment available for all types of weed and scrub control.

Manufactured by

J. H. BARBOUR & SON LTD.
Paragon Chambers, Kelburn Ave., Wellington.

G5734.12

Surface Drainage on the Hauraki Plains

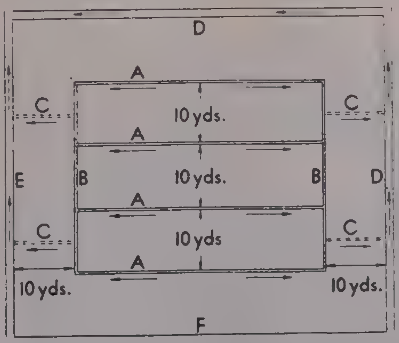
NO farmer denies the necessity for good farm drainage. It is significant, however, that winters of abnormally low rainfall, when the effects of poor drainage do not manifest themselves, are followed on the Hauraki Plains by less deterioration of pastures due to poaching and less infestation by weeds such as buttercup and pennyroyal. Production during such seasons is also very much higher than usual. In this article G. L. Banfield, Instructor in Agriculture, Department of Agriculture, Thames, describes methods of making surface drains which have proved successful on the Hauraki Plains and the advantages resulting from such drains.

ALTHOUGH farmers are aware of the benefits of good drainage, they do not find such drainage easy to obtain on the Hauraki clay. Open drains along boundaries and subdivisional fences give considerable relief, but they do not provide the entire answer owing to the limited area from which the drains will draw. Farmers are familiar with the sight of pools of water lying on the very edge of open drains. No matter how close these drains are placed, the area between the drains is too wet during winter and spring to support the weight of cattle which the pastures are capable of feeding.

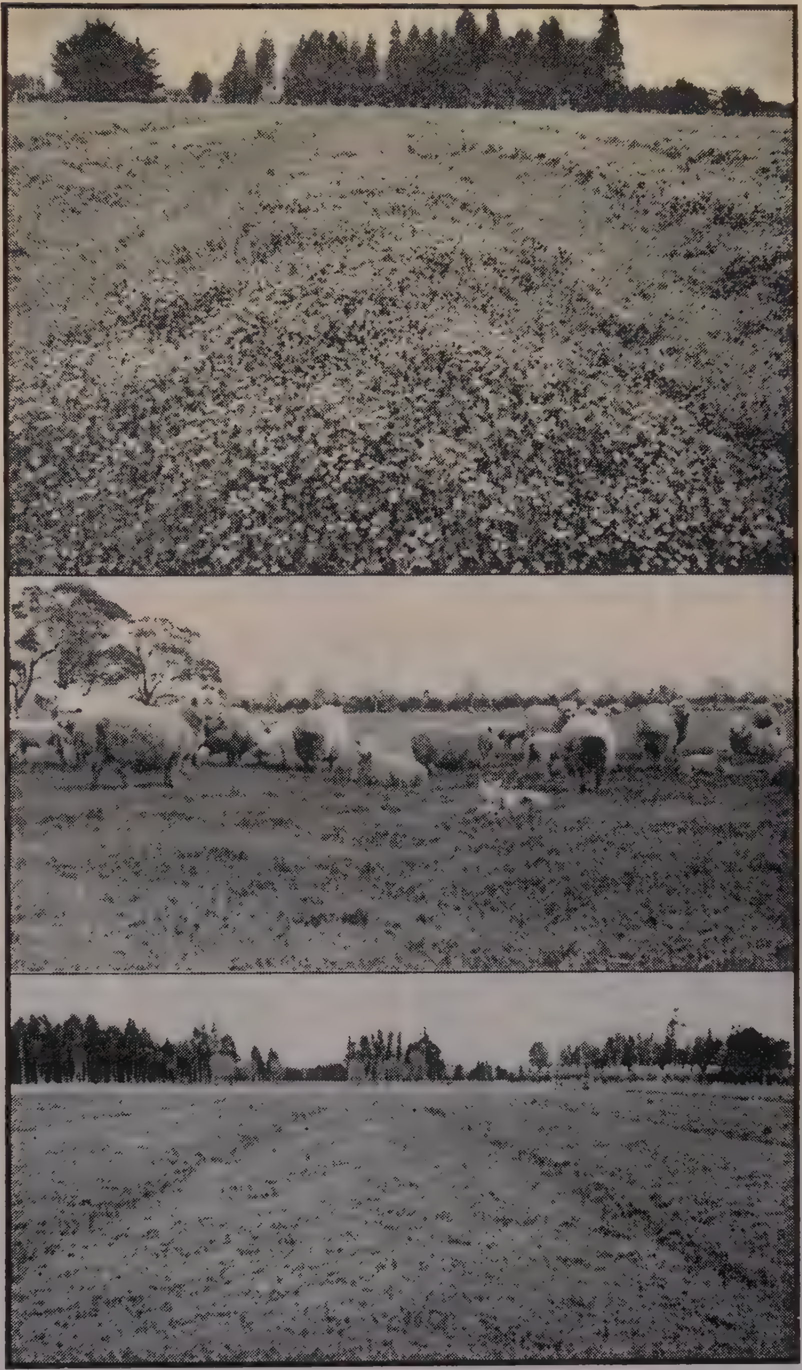
Underground drains such as tiles, fascines, and moles have failed to function satisfactorily in Hauraki clay and have not been worth the cost of their construction. This may be because water in the main communal drains tends to back up at times, causing the drains to silt up in much the same way as a river tends to silt up at its mouth. Tiles and fascines have worked for a relatively short period only and results have not warranted the high cost of a tile drainage system intensive enough to be of value. Moles, if they have any great length, cannot be expected to function satisfactorily with a fall of as little as 1 in 1000.

The Surface Drain

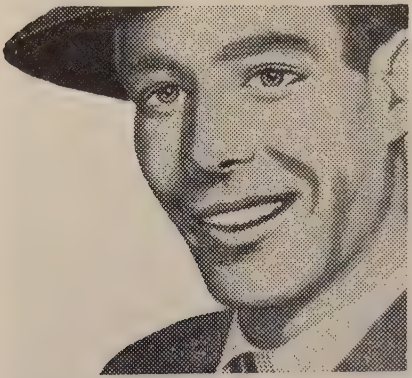
Since water will not percolate through the Hauraki clay rapidly enough in periods of heavy rainfall, the only course left open is to run the water off the surface as quickly as possible by a surface drain. Surface



Plan of layout of a surface drainage system. A—Surface drains. B—Headland drains. C—Tiled outlets. D—Open drains. E—Main outlet. F—Fence.

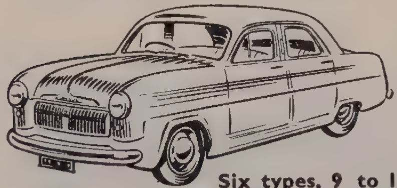


Upper—Sheep will control buttercup, which is prevalent in new pasture on the Hauraki Plains, and will keep buttercup and ryegrass at a level at which clover can compete successfully. Sheep also consolidate the ground, and maintain an even surface. Middle—The pasture in the surface drain where the ewe is lying is not markedly inferior to the pasture on the lands. Lower—Well-made surface drains do not mar the appearance of a paddock and keep land firm throughout the wettest periods of the year.

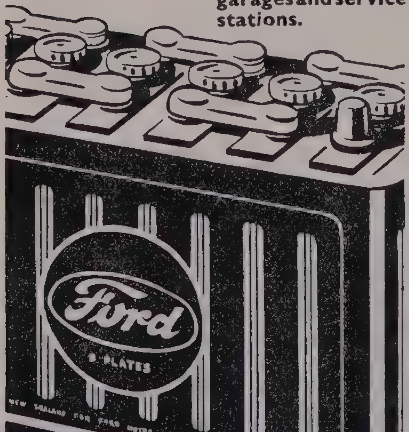


SALESMAN SAYS—

"I'm on the road every day . . . and with radio and other extra equipment I depend on a Ford Battery."



Six types, 9 to 15 plates. From Ford Dealers, leading garages and service stations.



Ford
9 PLATES
NEW ZEALAND FORD MOTOR COMPANY OF NEW ZEALAND LIMITED
GENUINE HARD RUBBER

Ford

THE POWER PLUS BATTERIES FOR EVERY MAKE OF CAR, TRUCK, TRACTOR

FORD MOTOR COMPANY OF
NEW ZEALAND LIMITED LOWER HUTT

253 9

FLOREAT · IMPERII · PORTVS

Ship via London

The
PORT OF LONDON
AUTHORITY

A Self-governing Public Trust for Public Service

London—the Premier Port of the Empire—equipped for all types of ships and cargoes.

For full particulars apply to :
Mr. W. C. Perkins,
22 Loftus Street,
Sydney.

"A boon for all burning and spraying jobs"

As a powerful yet safe Flamethrower, the DRAGON is acclaimed by users everywhere—and when quickly and easily converted to a high pressure sprayer it again proves its value for use with creosote, insecticides and all acid containing sprays.

Over 9000 Sold!

For burning and spraying get a DRAGON—it will pay you.

Enquire from

DALGETY
& CO. LTD.
All Branches

DRAGON
FLAME
THROWER
DALGETY & CO. Ltd.

drains require very little depth of outlet compared with underground drainage systems.

This form of drainage of course has its disadvantages, but it is contended that if stiff marine clays such as the Hauraki clay are to be farmed satisfactorily, there is no alternative. The surface drains are either ploughed in or graded in such a manner that the land between the drains has a marked camber. Those farmers who have constructed proper surface drains have been successful in drying their land so that it remains firm throughout the wettest periods of the year.

Making of Drains

One farmer on the Hauraki Plains has made an outstanding success of surface drainage and the following information is based largely on his experience.

Grading is best carried out where the paddock is already worked down to something approaching a seed-bed. To obtain such a condition on country such as that on the Hauraki Plains the initial working should be carried out in spring as soon as the ground is dry enough to work but not so dry that the soil has started to cake hard. An occasional cut with discs during a summer fallow will generally result in the required condition by the time it is desired to put in the surface drains. Unless the initial working is carried out early enough, final work with the grader is difficult because the unrotted turf is dragged to the surface. The more usual although not so desirable practice is to cut the drains while the paddock is still down in pasture.

Surface drains can be constructed at any time of the year provided the surface of the ground is firm. If an attempt is made when the ground is too wet, the grader shaves off a cheesy mass rather difficult to break up and also the wheels of the tractor tend to cut up the paddock. The drains should be constructed early enough to facilitate preparation and consolidation of a seed-bed for regrassing. Surface drains have been constructed mainly in January and February.

The best distance apart for surface drains is apparently 10yds., and for best results the drains should not exceed 5 to 6 chains in length. If the drains are placed farther apart than 10yds., it is difficult to maintain an even camber on the lands, which is so important in the rapid shedding of water. Obviously it is undesirable to place the drains closer than is necessary. Where the lands are not cambered up but have been left quite flat results are not nearly so successful.

A surface drain in course of construction with a patent surface drainer. Two more cuts are required to finish the grading of the banks.

Grading

Headland drains should be graded 10yds. from the fences before the remainder of the drains are constructed at right angles to them. Drains off the headland drains should be graded in the direction of fall, if any, but as the country in the Hauraki Plains is practically level, it is a good plan to make fall when constructing the furrows by decreasing the cut at the centre of the paddock and increasing it at both ends.

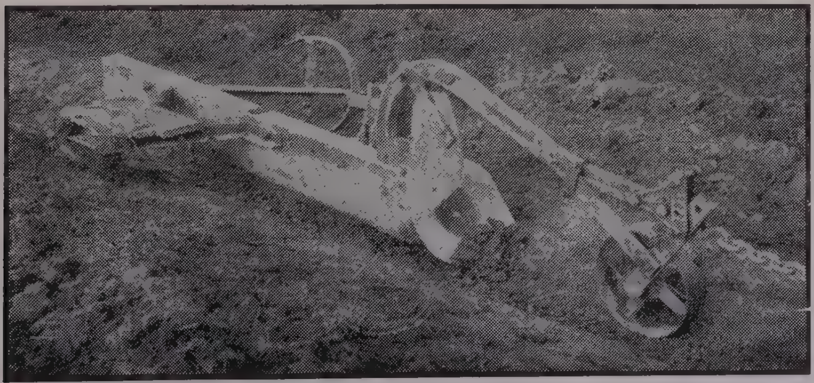
The best procedure found has been to make two to three cuts with giant discs before working with the grader, and this can be repeated if necessary. Two to three acres can be graded in 1 day after the discing has been done. When all the furrows have been made the headland drains are cleaned out finally by the heel of the grader blade throwing the spoil toward the fence. If the headland drains were constructed last, the rest of the drains would be sealed off at each end by the soil thrown up by the grader.

It is essential that no shoulder be left on the edge of the drains, so that all classes of implements can be worked with ease. Where drains have been properly made it is possible to mow or work the pick-up baler either with the drain or across the drain. Sweeping, however, must be carried out in the direction of the lands. A final touch-up with the shovel is usually necessary as soon as there is sufficient water in the furrow to give an idea of levels.

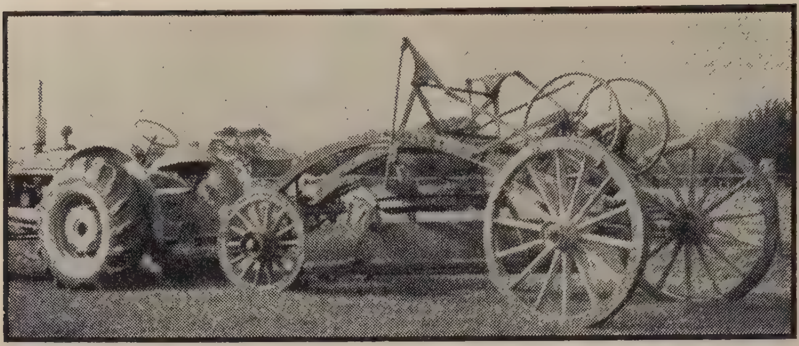
Outlets to the open drains surrounding the paddocks are cut through the headlands after sufficient rain has fallen to indicate the lowest regions. These should be tiled to avoid damage by stock, and a sufficient number of outlets should be put in to carry away the water satisfactorily.

When the surface drains are complete it is necessary to resow the whole area. The degree of success with this operation depends on the seed-bed produced. Where the breaking up of a paddock before grading has been carried out early enough to permit rotting of the turf no difficulty arises. Where the turf has not had sufficient time to rot it will become graded up on to the highest portions of the land, resulting in a poor, unconsolidated seed-bed along the ridges. As a result strikes of grass and clover seed in such areas can be poor.

Control of the new grass on Hauraki Plains country is just as important as on any other soil type if the growing clover seedlings are not to be smothered. In a reasonably dry winter this is no problem, but more often than not conditions become too wet to permit grazing by cattle or even by calves. Under these circumstances sheep have proved to be the only answer. The sheep will control buttercup, so prevalent in new pastures on the Hauraki Plains, and will keep both



A patent surface drainer in operation.



Old horse graders are ideal for making surface drains.

buttercup and ryegrass at a level at which the clover can compete successfully. At the same time, instead of cutting up the paddock as would be the case if cattle were used, the sheep consolidate the ground and maintain an even surface. To do this properly they must be put on in large numbers for short periods to avoid selective grazing, but such overgrazing has proved very much less damaging to the new sward than has undergrazing.

The value of sheep in the development of the new pasture is stressed because the money and effort put into surface draining and resowing a paddock are considerable, and much of this work can be in vain if subsequent management is not up to standard.

Maintenance

Where the surface drains have been well constructed practically no further maintenance work with the grader is required. Rushes may have to be dug in the drains for a year or two, but after that they give very little further trouble. Departmental trials in the Hauraki Plains area to date suggest that spraying of the rushes with 2,4-D about 3 months after cutting them is likely to lighten the work of rush control in the future. Other weeds such as buttercup and pennyroyal are easily controlled with hormone weedicides. Pasture growth is poor in those parts of a surface drain which are a little deeper than the general level of the drain.

Grading Equipment

Old horse graders, of which there are many on the Hauraki Plains, are ideal for putting in surface drains. Their power-driven equivalents as used these days for road maintenance are also ideal and considerable use has been made of the hire service provided by the Hauraki Plains County Council. The difficulty with the county service is, however, that the graders are seldom available when required by the farmer, and costs are high.

Grader ditchers and tractor-mounted blades have not proved very successful, as they tend to follow the contour of the ground rather than produce an even grade.

One farmer on the Hauraki Plains has invented and patented his own surface-draining machine, which has created considerable local interest. This machine uses a grader blade set at an angle to a central boom similar to those on some grader ditchers, but differs in that the grader blade is used mainly to deal with spoil cut out by a disc blade set in the position usually occupied by the share of an orthodox single-furrow plough. The machine also makes use of the beam of an old plough.

This surface drainer will cut a U-shaped drain and then by adjustment of the grader blade will grade off the banks of the drains and spread the spoil across the intervening lands. Two cuts will produce a U-shaped drain and a further two to four cuts will produce a graded surface drain.

Apart from its main attribute of low cost, the following advantages are claimed for it:—

1. It requires only a medium-power tractor for its operation on heavy soils during dry conditions.
2. Preliminary ploughing or discing is unnecessary, even on the hardest country.
3. Only one man is required for its operation, which is extremely simple.
4. It will not run out like most grader-type ditchers tend to do and does not rise and fall as tractor-mounted ditchers do.

This article deals specifically with the surface-drainage problem on the Hauraki Plains, but considerable use could be made of surface drainage in other parts of New Zealand, particularly on land adjoining tidal estuaries where the soil is very heavy and the ground level is only just above that of the water.

Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given during November as follows:—

1XH Hamilton, 12.33 p.m.

5 November—"Trace Element Deficiencies of Stock", by D. W. Caldwell, Veterinarian, Department of Agriculture, Hamilton.

12 November—"Aspects of Silage Making", by J. R. Murray, Instructor in Agriculture, Department of Agriculture, Hamilton.

19 November—"The Year in Retrospect", by J. R. Turnbull, Federated Farmers, Hamilton.

26 November—"Combating Parasites and Common Ailments of Poultry", by W. L. Jourdain, Poultry Instructor, Department of Agriculture, Hamilton.

1YZ Rotorua, 7.15 p.m.

12 November—"Control of Rushes", by A. V. Allo, Instructor in Agriculture, Department of Agriculture, Tauranga.

26 November—"Remedies for Quality Faults in Milk and Cream", by E. P. Carter, Special Inspector, Department of Agriculture, Hamilton.

2ZA Palmerston North, 12.34 p.m.

2 November—"Sheep, Seasonal Stock Notes", by E. Nelson, Livestock Instructor, Department of Agriculture, Palmerston North.

9 November—"Phosphate Topdressing", by A. A. Duncan, Instructor in Agriculture, Department of Agriculture, Wanganui.

16 November—"Recognition and Control of Serious Garden Pests", by B. P. Coleman, Horticultural Instructor, Department of Agriculture, Palmerston North.

23 November—"Quality Faults and Their Remedies", by J. A. Power, Farm Dairy Instructor, Department of Agriculture, Waipawa.

30 November—Y.F.C. Session, by I. G. Tabor.

3YA Christchurch

5 November (7.15 p.m.)—Review of the "New Zealand Journal of Agriculture", by E. G. Smith, Fields Instructor, Department of Agriculture, Rangiora.

16 November (12.20 p.m.)—Talk, by members of Federation of Young Farmers' Clubs.

4YZ Invercargill, 7.15 p.m.

3 November—"Root Crops", by A. R. Rankin, Fields Instructor, Department of Agriculture, Invercargill.

10 November—"Spring Requirements of Bees", by S. Line, Apiary Instructor, Department of Agriculture, Invercargill.

17 November—"Hay", by R. W. Bush, Fields Instructor, Department of Agriculture, Invercargill.

Regular Sessions

1XH Hamilton, Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (Waikato stock review).

1XN Whangarei, Mondays at 8.1 p.m., Wednesdays at 8.1 p.m. (Northland stock market report), Fridays at 8.1 p.m.

1YA Auckland, Mondays at 7 p.m. (Auckland stock market report), Tuesdays at 12.35 p.m., Wednesdays at 7 p.m., Thursdays at 12.33 p.m.

1YD Auckland, Thursdays at 7.30 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock review), fortnightly on Tuesdays at 12.33 p.m. (Federated Farmers' session), Tuesdays at 6.55 p.m. (Frankton stock market report), Thursdays at 12.33 p.m., Thursdays at 7.15 p.m. (farm talks alternating with session for Bay of Plenty farmers), fortnightly on Fridays at 12.33 p.m. (pig council talk).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m.

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawkes Bay orchardist session), Tuesdays at 7 p.m., Wednesdays at 7.10 p.m. (Hawkes Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

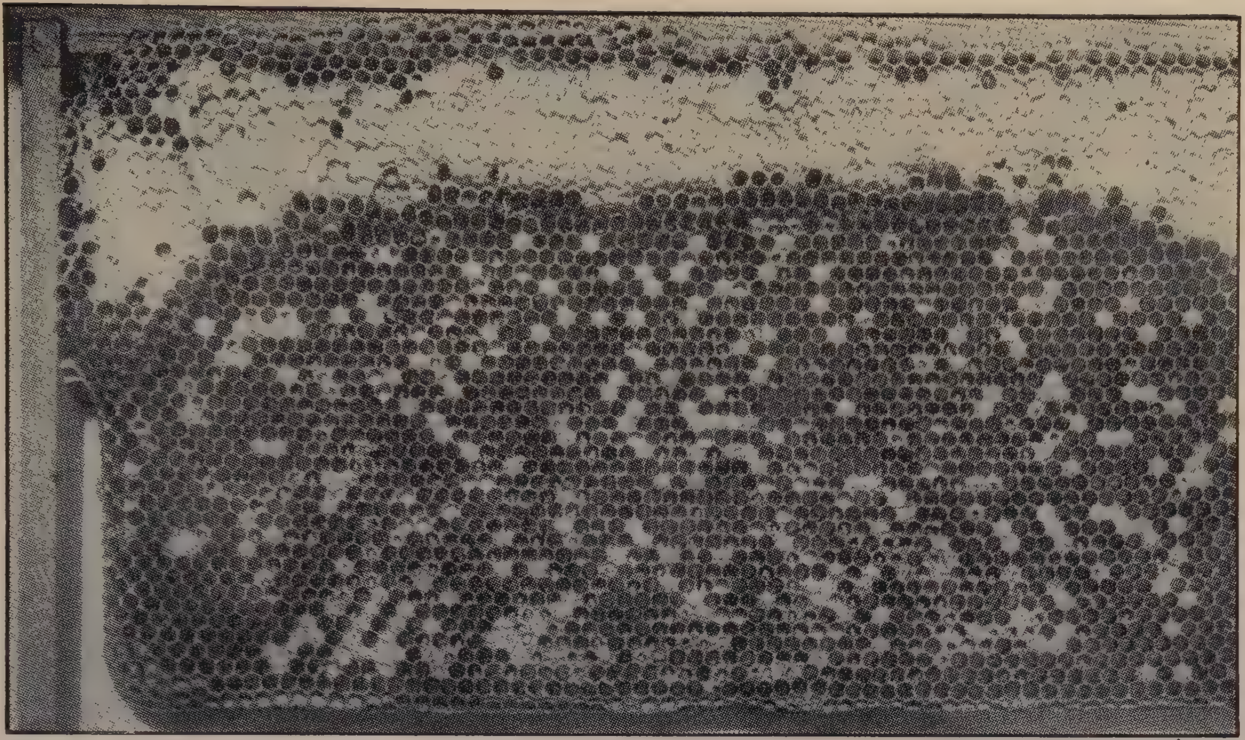
3XC Timaru, Tuesdays at 8 p.m., Thursdays at 8 p.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Thursdays at 12.33 p.m.

4YA Dunedin, Wednesdays at 7.20 p.m., Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m. and 7.15 p.m., Tuesdays at 7.5 p.m. (Farm and Country session, including Lorneville stock market report), Thursdays at 12.33 p.m.



HEADING ILLUSTRATION: Part of a brood frame containing sac-brood, taken from an experimental colony in which the disease was produced by feeding the virus of the disease. U.S. Department of Agriculture Bulletin No. 431.

Sac-brood: The Need for Better Bees

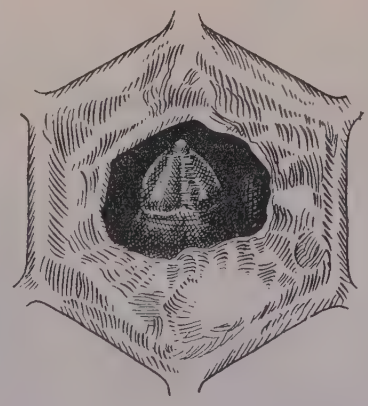
IN many areas, and mainly among the hives of smaller beekeepers, a great deal more sac-brood is noticed than there would be if beekeeping standards were better. Sac-brood and the need for better bees may in the first instance appear to have no relation, as sac-brood is an infectious virus disease. However, colonies in which the queens have been bred by selection over a period of years to produce healthy, vigorous bees of good stamina seldom suffer from this disease. In this article L. A. M. Griffin, Apiary Instructor, Department of Agriculture, Hastings, stresses the need for breeding better bees to help prevent this disease and so increase returns from hives.

ANY condition that tends to lower crop returns from hives is of economic importance and should be avoided wherever possible, but many beekeepers fail to realise the loss sac-brood disease can cause in returns from hives. The loss of a small amount of brood is not in itself serious, but where a considerable amount of sac-brood is present in hives throughout the season a more serious view should be taken.

Disease Indicates Deterioration

Not only does the disease tend to weaken the colonies and lower crop returns, but it shows that a slow deterioration is taking place in the bees themselves. They are lacking in those vital qualities so necessary not only to keep the disease at bay but to store a payable crop of honey.

Sac-brood is a disease of the sealed brood often wrongly called by many beekeepers pickled brood. It differs from the other more serious brood diseases because it is caused by a filterable virus so minute that it is impossible to see it even under a microscope. It will pass through filters which will stop bacteria and their spores.



[*U.S. Department of Agriculture Bulletin No. 431*

End view of a cell containing a larva dead of sac-brood, with a cap which has the appearance of never having been completed.

Filtrates obtained by crushing infected larvae recently dead, diluting the fluid with distilled water, and passing it through filters will again produce the disease if fed to healthy colonies.

Larvae die during the first 4 days after sealing of the cells, the greatest mortality occurring during the last 2 days immediately preceding the change to pupae.

Course of Disease

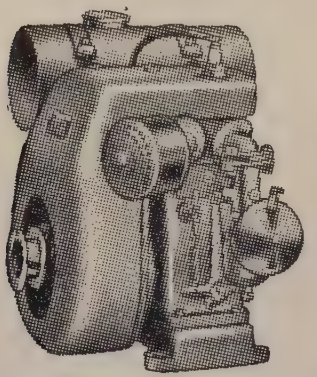
Sac-brood is an infectious disease, the most infectious stage being the recently dead larva when it is pale yellow. As the larva decays and dries the colour grows deeper and finally becomes a very dark brown or almost black. Generally the head part is standing up at right angles to the body and is black. In this latter stage the bees finally remove the larva piecemeal and carry it out of the hive.

Not much is known about how the disease is spread. The interchange of combs containing affected brood is undoubtedly one way it can be spread by the beekeeper. Robbing may also spread the disease, but drifting bees are apparently no danger.

In the early stages the skin of the dead larva is about three-quarters full of a granular liquid. This granular appearance is due chiefly to the decaying fat cells in the fluid. The skin

MORE THAN 1,000,000

OF THE WORLD'S MOST *RELIABLE WORKERS!*



More than 1,000,000 . . . that's a lot of motors . . . chosen because of their dependability, higher efficiency, and lower operating costs. Throughout the world discriminating buyers have learnt they can rely with absolute confidence on the name Villiers.

Villiers

LIGHTWEIGHT ENGINES

1 - 2 - 2½ - 4 H.P.

and the same range of sizes also available with 3 to 1 reduction gear.

N.Z. Factory Representatives:

F. W. CAVE LTD., P.O. Box 1685, Auckland.

SPEEDWAY

LOW & HIGH PRESSURE OIL BURNING BOILERS

Write for free illustrated catalogue to

SPEEDWAY PRODUCTS LTD.

26 Albert St., Auckland

South Island Distributor:

A. H. TURNBULL & CO. LTD

Christchurch

SB-1-2

MUNRO TRIUMPH TOPDRESSER, the last word in topdressing efficiency. Will mix and sow lime and fertiliser, 1cwt. to 3 tons per acre; also sow seeds; 14ft. spread attached trailer or truck at 10 m.p.h., an acre covered in 3½ minutes. £64 on trucks Invercargill: freight N.I., rail/air, £4/10/- to £5/10/-; less by boat. Initial deprec'n 30 p.c. (£19/4/-) plus ordinary 7½ p.c. allowed on taxation. Immediate delivery from J. M. McCROSTIE, Box 67, Invercargill. Booklet full description and instructions available on application.

PIFCO *Dualite* **LANTERN**

. . . a PORTABLE

Electric FARM LANTERN

with 1,000 uses!

Invaluable all around the farm. A powerful penetrating spotlight or a brilliant broad floodlight, interchangeable at the touch of a switch. 45 hours' light from a 6-volt battery. Adjustable for top, bottom or side lighting wher ver required. Steel body, robust and weatherproof, grey finish.

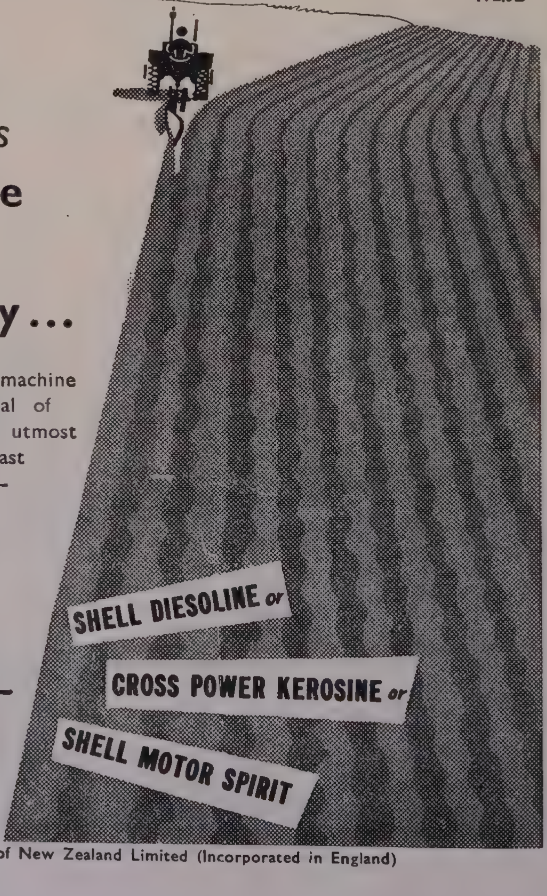
Available at Electricians and Hardware Stores everywhere.

Factory Representatives:

OVERSEAS MANUFACTURERS AGENCIES LTD.

P.O. Box 2321, Wellington.

Tr2.5D



The **wise farmer** has **much more** to show **for his money...**

He is certain every machine is using its full potential of power to give the utmost working acreage and least time lost in overhauls—

When he insists on SHELL tractor fuels—

SHELL DIESOLINE *or*

CROSS POWER KEROSINE *or*

SHELL MOTOR SPIRIT

SHELL

The Shell Company of New Zealand Limited (Incorporated in England)

should not be broken by the beekeeper, as in cleaning out the remains the bees tend to spread the disease more rapidly through the brood. The amount of virus in one single larva when fed experimentally to a healthy colony was found sufficient to produce the disease in approximately 3000 larvae. The virus will not survive in the dry state or in honey for longer than a month, and direct sunlight will kill the virus in the dry state in 6 to 7 hours.

Incidence of Disease

The disease is usually mild and only scattered cases occur in an apiary, but all colonies in an apiary may be affected in varying degree, from a few cells scattered over the brood combs to large areas of dead brood in the more severe cases.

In more serious cases the outward appearance of the capped brood is at first sight similar to that of brood infected with American foul-brood disease, the cappings of the cells being flat, sunken, and dark in appearance, and usually perforated by the bees.

In a case of foul-brood the whole larva, outer skin as well, collapses into a gluey mess, which can be roped out on a stick, whereas in sac-brood disease the skin of the larva remains intact and very tough, and with care a diseased larva can be removed from its cell entirely without breaking the skin.

Although cells of sac-brood may occasionally be noticed in colonies of bees of a fairly good strain, generally in the early part of the year, incidence is not likely to increase and the disease will probably disappear altogether later in the year. In bees less resistant to the disease it may persist throughout the season.

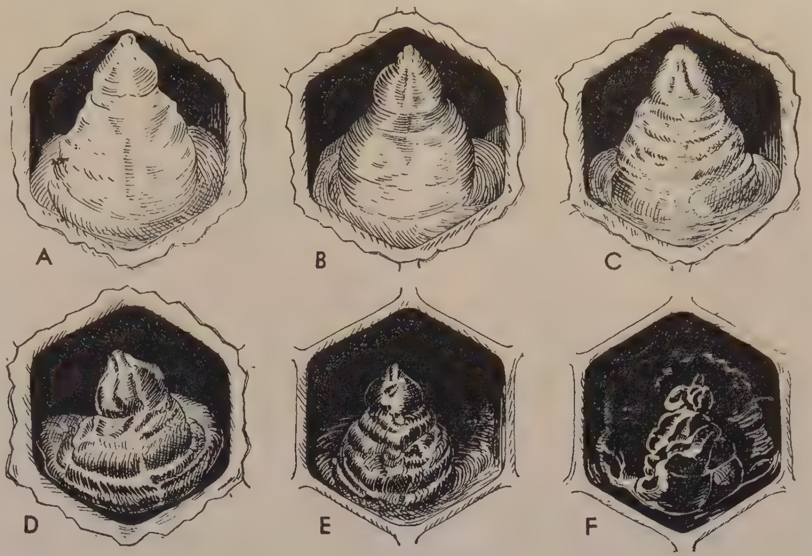
Adult Bees Affected

Although sac-brood is a brood disease, it is noticeable in all colonies seriously affected with the disease that the adult bees appear sick too. They lack energy and vigour, and this shows very clearly in all the hive duties they perform.

The cappings of the brood instead of having a new appearance, as they would have in a healthy, vigorous colony, are usually dark, flat, and sometimes greasy in appearance, the reason being that owing to the bees lacking vitality, they take the easiest way to perform their duties. Very little new material is used for this purpose, old capping material and odd pieces of comb chewed down being used many times over.

This lack of vitality also shows up plainly in the feeding of the young larvae, which are generally very small and undernourished. These sickly, underfed larvae develop into the same type of bee and are useless for honey production. Severe cases like this are few, but cases where there are always a few hundred dead larvae in the brood nest are not so rare. This is a loss in every respect, for such an incidence adds up to a large number of bees during the season, plus the wastage of food and the work of the bees in raising the brood. Also to be considered is the infected brood subsequently raised in the same cells. All these tend to weaken a colony of bees.

Where a large number of colonies are affected the loss is worth considering.



[*U.S. Department of Agriculture Circular No. 392*

A—Oral view of healthy larva at the age when death usually occurs from sac-brood. B to F—Stages in the decay and drying of a larva dead of sac-brood.

First-class Stock Essential

Although under experimental conditions it is possible to kill healthy colonies completely by constantly feeding a syrup containing the virus, healthy, vigorous colonies that have been experimentally infected with the disease, if left alone, will recover without any assistance from the beekeeper.

Therefore, the answer to the major part of the problem seems obvious. Although sac-brood is a virus disease, it can be prevented by the keeping of only first-class stock that has been bred by selection for the disease-resisting characteristics of vigour and stamina and all the other qualities so necessary to give the maximum returns.

The bees of such queens are thorough in all their duties. Not one hive duty is neglected or not performed really well, and this applied energy and the hygienic methods in the hive prevent sac-brood to a great extent. With such stock old capping material is seldom used again, and the young larvae receive ample supplies of food. Flat or sunken cappings over the brood are never found in colonies of this calibre.

Requeening Practice

The practice of requeening a substandard colony by killing the old or defective queen and allowing the colony to raise another is wrong, as it only perpetuates and often aggravates the weakness in the colony. It is as bad to take a nucleus from the parent colony and allow it to raise a cell.

Breeding of Stock

The three-banded Italian bee is probably the best all-round bee, but unless breeding is carried out continually by selection, not only for evenness of marking and colour but for all the qualities desired, such bees can so deteriorate that they will not be any better than some of the poorer races.

It is possible by wrong selection to produce Italian bees that are too soft and poor honey producers, queens that are such prolific layers that the area of brood and number of bees in the hive are out of all proportion to the returns in honey, and bees that give large returns in honey but are vicious or very difficult to handle. On the other hand it is possible by careful selection over a number of years and by the right breeding methods to breed a strain of Italian bees that will be easy to handle and will gather good payable crops; and queens which will keep a good open brood nest at all times without assistance from the apiarist and which when they reach their peak of laying will hold it and so discourage swarming.

It is necessary to have a fairly large number of colonies to select from. The potential breeding stocks should be under close observation for 2 seasons for the beekeeper to make sure of one of the most important qualities in the queens—stamina. The queens of these colonies should be able to build up as good a brood nest in the spring of their third season as they did in the 2 previous years (allowing for an autumn requeening) with little or no help from the apiarist. Unfortunately this third year is the only year a queen should be used as a breeder, so it is necessary always to have a number of potential breeders under observation. All other characteristics required should have been noted in the 2 previous years and records kept.

If the queens or their bees fail in any of the points required, the queens should be discarded as future breeding queens, but the colonies may be used for nursing. Only the very best queens should be used as breeders. Good stock will always give the best returns and a greater freedom from disease.

Pasture Improvement on Light Land in Mid-Canterbury

By R. INCH, Fields Instructor, Department of Agriculture, Ashburton

Profile of Lismore shallow stony loam. The profile is typical of the droughty soils of the Canterbury Plains and of the soil on the farm described in this article.

IN Mid-Canterbury the lighter soil types comprise some 300,000 acres, or almost half of the cultivated land in Ashburton County. Farming on this soil type has been difficult for many years, but modern knowledge and up-to-date farming methods have altered this, and the use of lime, phosphatic fertilisers, and subterranean clover has made it possible to secure a much higher standard of pasture production.

ASHBURTON County, or Mid-Canterbury as it is commonly called, is that area of land bounded by the Rakaia and Rangitata Rivers and extending from the coast to the main dividing range of the South Island. Of its total occupied area of 1,313,657 acres in 1949-50 nearly half is hill country used as sheep runs; the other 700,000 odd acres are mostly arable plains. The plains are made up of underlying, closely packed greywacke gravel interspersed with sand. The finer particles of the soil and subsoil are also derived from greywacke rock, deposited mainly by the action of wind, such a soil being known as loess. Its depth varies throughout the area, thus making soils of varying texture, water-holding capacity, and fertility. In addition to the loess formations, water-sorted alluvial deposits also occur, mainly along the Ashburton and Hinds Rivers, but also on portions of the land nearer the coast between these rivers. The latter soils are highly fertile.

It is the lighter soils that are the subject of this article, especially those classified as the Lismore series, ranging from a shallow silt loam to the shallow stony silt loam which is described as "very droughty, too shallow for much cultivation". This shallow stony silt loam is the lightest soil on the plains, and according to Grange has had the topsoil removed by blowing in prehistoric times. It is naturally low in both calcium and phosphate. It generally contains more coarse sand than do other soils of a similar type.

Climate

The annual rainfall of 28in. at Ashburton rises to 35in. on the foothills and falls to 23in. on the coast at Coldstream. It is reasonably well distributed, but as in many other districts there is a considerable yearly variation. It has risen to as much as 46.44in. and fallen as low as 15.04in. Cold, south-east winds are prevalent toward the coast, especially during spring, and hot, dry nor'-westers in summer often dry out the moisture from the soil soon after rain ceases. Nor'-west showers are often experienced near the foothills, but these seldom reach far out on the plains. Owing to the general flatness of the ground, there is little natural shelter to break the force of the winds. Gorse hedges, with odd plantations, help to some extent, but the soil usually becomes very dry during summer and autumn.

Old Method of Farming

Under the old system of farming carrying capacity was low, the average being approximately ¾ ewe per acre. Few, if any, lambs were sold fat off their mothers. Frequent cultivation was necessary to provide supplementary and fattening feed, large areas of rape, turnips, greenfeed oats, and oats for chaff being grown. Pastures sown under these crops quickly reverted to hairgrass (*Vulpia* spp.), sweet vernal (*Anthoxanthum odoratum*), browntop (*Agrostis tenuis*), danthonia species, and flat weeds. Phosphatic manures were sown with the crops, but rarely was topdressing with fertiliser done or lime used.

The first general improvement was brought about by the introduction of subterranean clover in the late 1930s. As is general with such innovations it took time for this clover to find its place and for its management to be understood. It is now recognised as the legume of primary importance in the development of light land. Some topdressing with superphosphate was tried, but owing to the acid nature of the soil results were not outstanding.

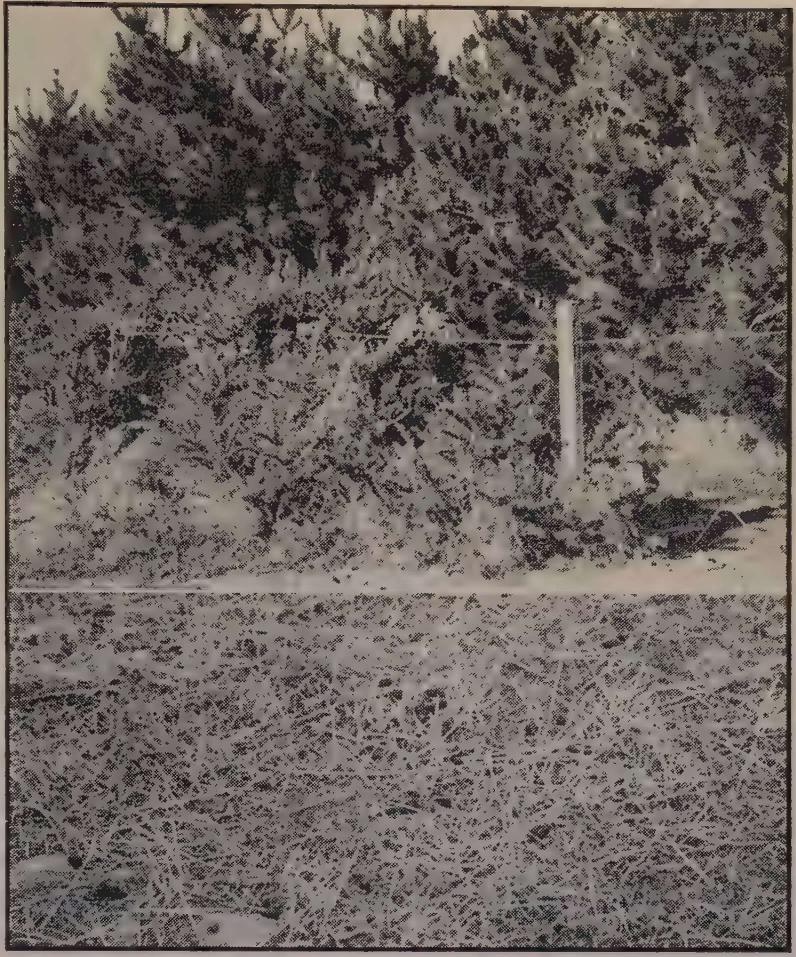
Improved Methods

The story of how a progressive young farmer, Mr. G. T. Askin, changed his method of farming is a good example of what can be done on this very light land. Similar methods are now being used by many other farmers with similar success, but he was one of the pioneers.

In 1940 his farm, situated in the Ealing-Coldstream district, consisted of 795 acres (a further 239 acres was purchased in 1945) and carried 750 ewes plus replacement hoggets. The sheep were not at all robust; some lambs were fattened and the surplus was sold as stores.

The wool clip averaged about 7½lb. per acre.

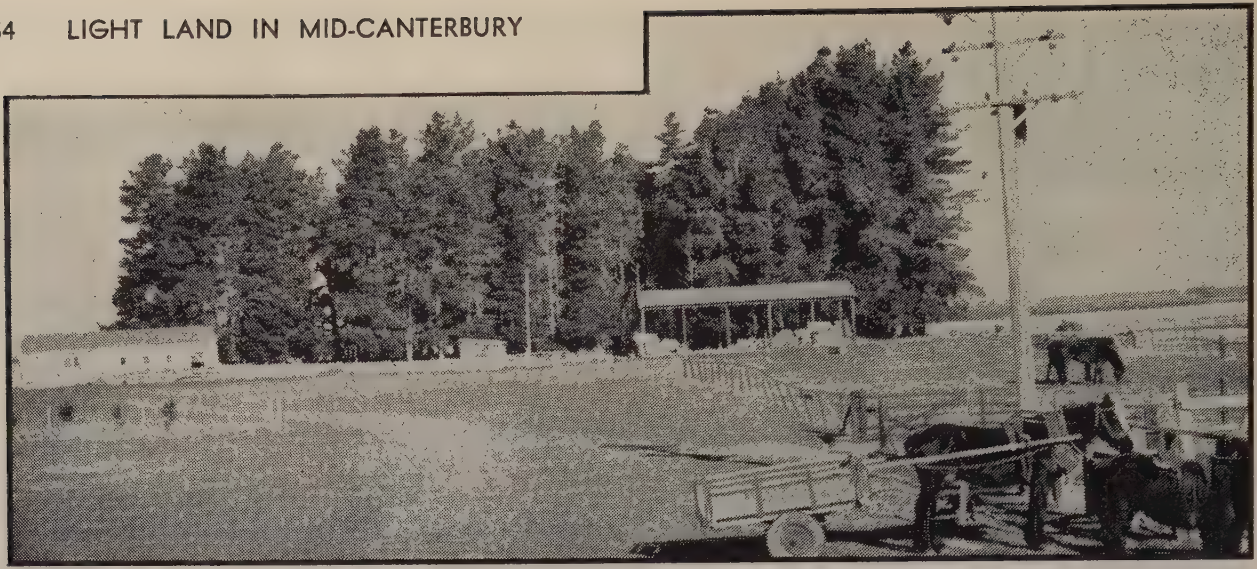
Each year 200 to 220 acres were cultivated and sown as follows: 80 acres of turnips and grass, 30 acres of white oats for chaff, 50 acres of oats for greenfeed, and 40 acres of rape and grass. The pasture mixture, sown with roots or greenfeed but never alone, was 25lb. of perennial ryegrass, 2lb. of white clover, 2lb. of dogstail, and



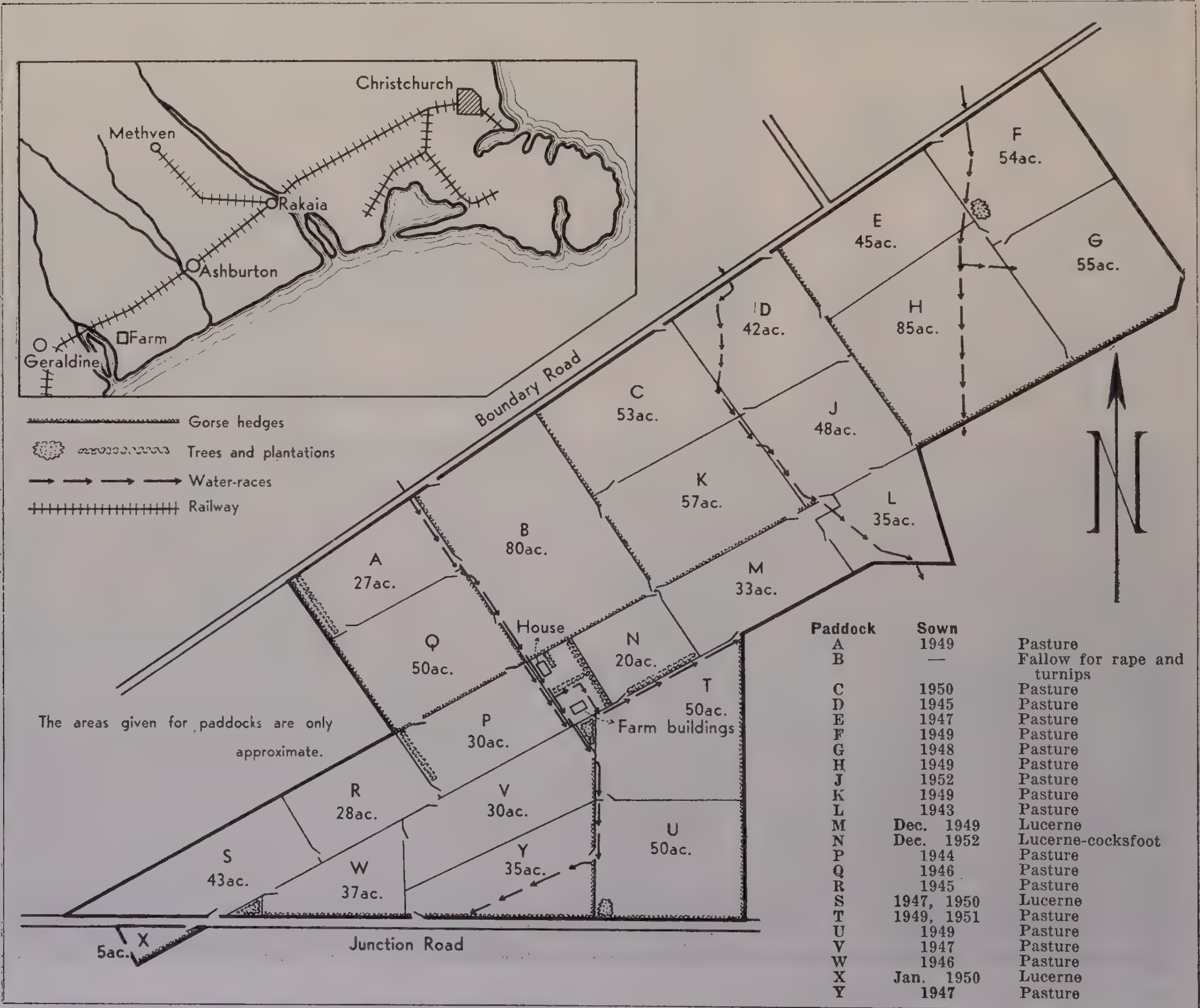
Upper—Gorse hedges and plantations give a little shelter. Lower—The soil can become very dry during summer.

Under conditions of low fertility pastures sown with greenfeed oats were never outstanding . . .

. . . and quickly reverted to sweet vernal and browntop.



Above—Buildings on Mr. Askin's property. In the left middle distance is part of a young shelter belt. Below—Plan of Mr. Askin's 1034-acre farm and locality map.


Christchurch
Methven
Rakaia
Ashburton
Farm
Geraldine
Gorse hedges
Trees and plantations
Water-races
Railway
Boundary Road
Junction Road
The areas given for paddocks are only approximate.
House
Farm buildings
N
A 27ac.
B 80ac.
C 53ac.
D 42ac.
E 45ac.
F 54ac.
G 55ac.
H 85ac.
J 48ac.
K 57ac.
L 35ac.
M 33ac.
N 20ac.
P 30ac.
Q 50ac.
R 28ac.
S 43ac.
T 50ac.
U 50ac.
V 30ac.
W 37ac.
X 5ac.
Y 35ac.

Paddock	Sown	
A	1949	Pasture
B	—	Fallow for rape and turnips
C	1950	Pasture
D	1945	Pasture
E	1947	Pasture
F	1949	Pasture
G	1948	Pasture
H	1949	Pasture
J	1952	Pasture
K	1949	Pasture
L	1943	Pasture
M	Dec. 1949	Lucerne
N	Dec. 1952	Lucerne-cocksfoot
P	1944	Pasture
Q	1946	Pasture
R	1945	Pasture
S	1947, 1950	Lucerne
T	1949, 1951	Pasture
U	1949	Pasture
V	1947	Pasture
W	1946	Pasture
X	Jan. 1950	Lucerne
Y	1947	Pasture

Adequate supplies of hay have proved a good investment.

3 to 4lb. of subterranean clover; 1¼cwt. of superphosphate was applied at seeding only and no lime was used. Clovers were never strong and the pastures, only fair at best, soon ran out. As may be imagined constant cultivation and resowing to maintain pastures made this type of farming very costly. It was not possible to save hay from the low-producing paddocks and oatsheaf chaff was needed for winter feed. An attempt was made to establish a 10-acre block of lucerne, but possibly owing to the low fertility of the soil at the time, this failed to establish.

Improvement Programme

In 1943, realising that this type of farming was leading to a dead end, Mr. Askin, with the assistance of one man began a programme of gradual improvement. His first big step was the application of 200 tons of lime at 1 ton per acre to his better pastures and the sowing of a further 5 acres of lucerne under better conditions. Both these operations were successful. Clover, especially subterranean clover, responded to the better soil conditions induced by liming and, besides giving more feed itself, promoted extra growth in the grass. Since then all the farm has been limed; most paddocks have now received 2 tons per acre and some 3 tons.

Lucerne

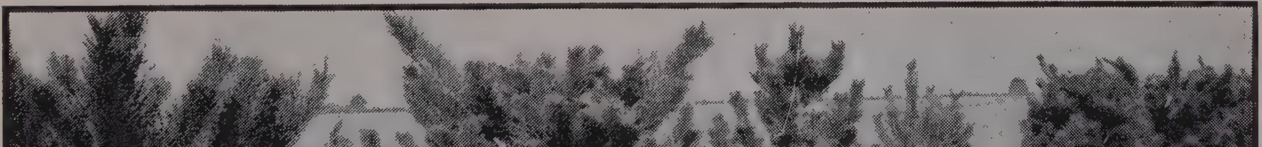
The first 10 acres of lucerne, sown in 1940, was a failure, but the 5 acres sown in 1943 proved so successful that a further 15 acres was established in 1945. Though the lucerne was intended primarily for hay, both these paddocks have been grazed at times and are still very good stands for this class of land. The value of lucerne hay as winter feed for sheep is recognised on this farm and last year a further 60 acres was laid down. This will be used for hay or for grazing as circumstances dictate.

The lucerne has all been sown from mid-December to early January, the first cut the following spring averaging 40 bales per acre. In the 1951-52 season some of the first cut was sold, but enough was retained to keep the flock in good condition through a very dry year when autumn growth was at a minimum. Mr. Askin has been so impressed with stands of lucerne-cocksfoot seen in North Canterbury that he is now planning to replace some of his ordinary pastures with this mixture and has sown the first 20 acres.

Present Position

In this type of farm development, where costs of improvement must be met from income, progress will not be rapid. The example quoted shows what can be done by initiative and hard work. The comparison between 1940 and the present shows the progress that has already been made.

The present flock, good-quality Corriedales, consists of 1600 breeding



Mr. Askin is now planting more trees for shelter.

Flying to U.S.A. and CANADA?

SEE EUROPE

on your way by Kangaroo Service

All Europe and Britain are easy to see on your way to North America when you fly the world's most colourful skyway—via Australia, the East and the Mediterranian—on the "Kangaroo" Route with QANTAS - B.O.A.C.

In only three days—if you wish to fly "express" from New Zealand—you can be in Rome, Zurich or Frankfurt to enjoy a thrilling sight-seeing adventure. See Paris—city of gaiety and fashion . . . London—colourful with pageantry. Then fly in luxury with B.O.A.C. across the Atlantic. Your Travel Agent can book you on one ticket all the way to U.S.A. or Canada and return.

Stop-overs at No Extra Air Fare. Spend extra days on stop-overs in any port of call at no extra air fare. Even before you arrive in Europe, there's so much to see and do—in Australia, Singapore, Ceylon, Cairo or Beirut.

Choice of Three Departure Points. Start your journey from Auckland, or Wellington or Christchurch. Almost daily TEAL services connect all three cities with QANTAS-B.O.A.C. "Kangaroo" service.

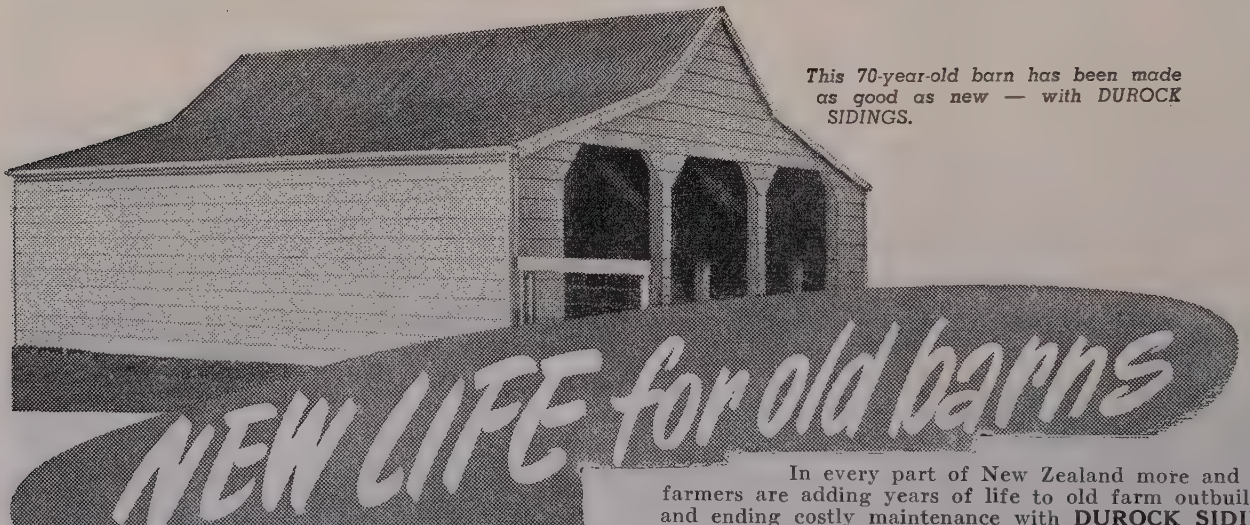
Six Services Weekly from Sydney for Europe linking with daily B.O.A.C. Trans-Atlantic air services.

You enjoy fine food, dinner wines, refreshments, transport and accommodation at night stops—all at no extra cost.

No Reserve Bank authority for fare required when flying the Kangaroo Service to Britain.

QANTAS AND B·O·A·C

QANTAS EMPIRE AIRWAYS LIMITED in parallel with BRITISH OVERSEAS AIRWAYS CORPORATION and Tasman Empire Airways Limited.
Reservations and Inquiries: TEAL Auckland, Wellington and Christchurch and leading travel agents throughout New Zealand.


NEW LIFE for old barns

This 70-year-old barn has been made as good as new — with DUROCK SIDINGS.

In every part of New Zealand more and more farmers are adding years of life to old farm outbuildings and ending costly maintenance with **DUROCK SIDINGS.** These timber-grained Asbestos-Cement Sidings are easily nailed over existing weatherboards, or old weatherboards can be removed and used as battens for the Sidings. The first low cost is a permanent investment . . . **DUROCK SIDINGS** never need a penny spent on them after they're up. Whether you're planning to repair old barns or build new outbuildings, use **DUROCK SIDINGS** and save money!

Durock

asbestos - cement SIDINGS

No maintenance; no painting; fire-resisting; weather-proof; and vermin-proof. Packed in convenient cartons of 20 Sidings. Nailholes already punched for easy fixing.

Contact your local merchant or send for full details to:—

DOMINION SALES CORPORATION LTD.

Auckland: Box 269 — **Wellington:** Box 2052
Christchurch: Box 1168 — **Dunedin:** Box 915

DS.9

New implement shed on Mr. Askin's farm. When the cost of improvements is being met from income development cannot be hurried.

ewes, 260 wethers, 35 rams, and 500 ewe hoggets for replacements and building up the ewe flock. All surplus lambs are fattened on the farm. Three-quarters of the ewe flock are bred to Corriedale rams, the remainder to Border-Southdown and Dorset Horn for fat lambs. Lambing averages 110 per cent. Old ewes are sold off fat without any extra feed.

Wool weights average 25lb. per acre, a decided increase on the original 7½lb. per acre.

Cultivation has been reduced to approximately half and today comprises 70 to 80 acres for turnips and 50 acres for rape. New grass is sown with approximately half of each crop and the balance of the pasture laid down is sown on a fallow. No oats are sown, either for greenfeed or for chaff, which has now been replaced by hay. From three-quarters to all of the established pastures are topdressed each year and remain down in fairly good condition for 6 or 7 years.

Ten years is a long time when it all lies ahead, but is a very short period in retrospect. Mr. Askin feels that the results have been worth while, but he is still planning further improvement.

Experimental Work on Light Land

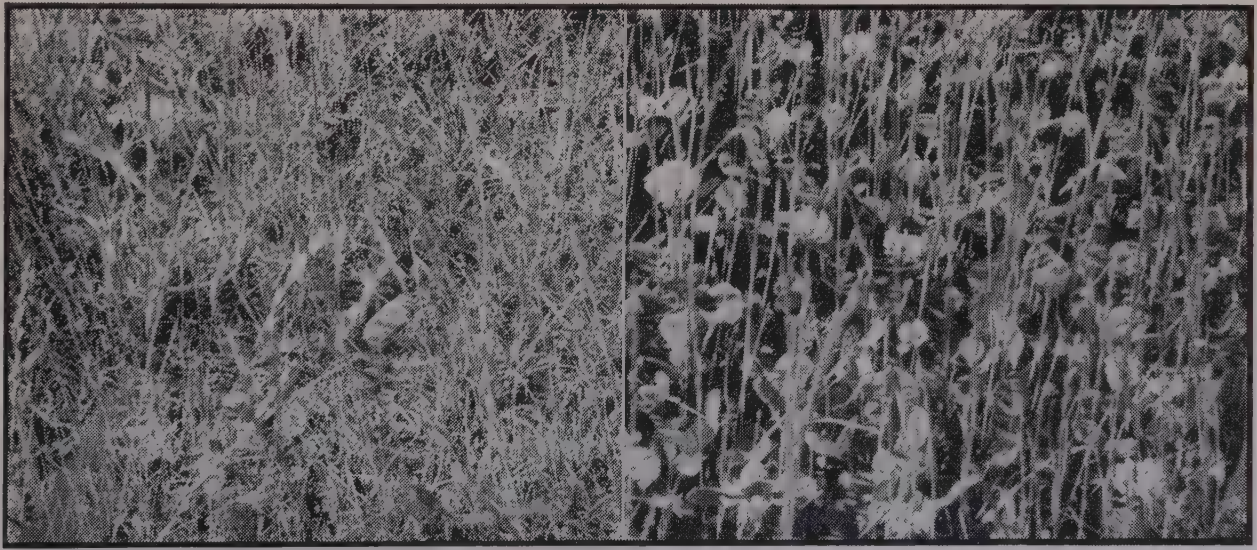
Over the years a considerable amount of experimental work has been done on light land by officers of the Department of Agriculture. Many of the results have now been translated into standard farm practice, but others are not so generally known. Following are recommendations from the results of trials and observations of successful practice:—

Lime and Phosphate

The Lismore series of soils are very low in both lime and phosphate and it is only when the levels of these are raised that good growth can be obtained. Lime and phosphate are complementary on these soils and though results may be obtained from either, it is only when the lime status has been raised to a reasonable level that the full benefits from phosphate are obtained. The soil-testing service provided by the Department of Agriculture offers a useful guide to the lime and phosphatic fertiliser requirements of these soils.

Potash

The potash levels of Mid-Canterbury soils are usually satisfactory and at present general use of potassic fertilisers cannot be recommended. On odd trials a response has been observed in the first year after application, but not later. Experiments are still being carried out with potash. With increased production there is a distinct possibility that dressings of



It is recognised that on the Lismore series of soils maximum pasture growth can be obtained only when the levels of both lime and phosphate are adequate. Left—Poor pasture. Right—Pasture greatly improved by application of lime. The illustrations are from photographs taken at points within 10ft. of each other.

WHAT IS A VALUER?

Prudent buyers and sellers act only upon the advice of a Registered or Public Valuer. The Registered or Public Valuer makes valuation for rates, rents, taxation purposes and all matters connected with Real Estate. In 1948, the Government created the Valuers Registration Board and only men of high integrity, ability, experience and qualifications are granted registration. Thus the public are protected by dealing only with a Registered Valuer or Public Valuer. Professional examinations are held annually and a university course is available.

The Institute publishes a quarterly journal devoted to current valuation problems with articles contributed by leading men in the profession.

Issued by the Public Relations Committee,
New Zealand Institute of Valuers,
General Secretary, P.O. Box 986,
WELLINGTON.

If you switch to
DRY DRENCHING
with "PHENOVIS"
Phenothiazine Pellets

You'll Drench Quicker And Minimise The Risk Of Wool Staining.

THIS scientific phenothiazine DRY drench has won New Zealand-wide praise.

"PHENOVIS" Pellets are safe, accurate, labour-saving. Accurate dosage is certain because each contains exactly 5 grammes of phenothiazine. The dose, given by a special instrument, ensures no "spit-out" and minimises risk of wool staining during drenching. Easier to carry than heavy liquids—and there's much less chance of waste. Order now for the season ahead.

Distributors:
SUMMIT PRODUCTS LTD.
Box 328, Palmerston North.

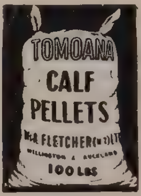
PREVENT THAT CHECK AT WEANING

No check at Weaning is the rule where Calves are wisely fed on ***Tomoana Calf Pellets***

CONTAINING linseed meal, fish meal, meat meal and selected cereal meals, Tomoana Calf Pellets can be FED DRY, and in this way the calf's digestive organs become more easily accustomed to solids.

Calves grow steadily and without check into robust and sturdy yearlings.

Feed **TOMOANA**
CALF PELLETS



NEW Design makes
SALOPIAN ONE-MAN FULLY AUTOMATIC
PICK-UP BALERS
. . . UNBEATABLE for PERFORMANCE, DEPENDABILITY and VALUE!

12 New Features

AVAILABLE IN 3 TYPES!
THE DOMINION MOTORS LIMITED
Wellington, Auckland, Christchurch, Timaru, or any Authorised Dealers.

potash may become necessary. At the present time and price its use for pasture does not appear warranted.

Perennial Ryegrass

For all general-purpose pasture mixtures perennial ryegrass forms the essential base. Despite the criticism to which it is subjected from time to time, it is the best all-round grass. It establishes quickly from seed, makes a good cover that helps to suppress any weed growth, and, provided topdressing is adequate and clover growth well maintained, it gives a large amount of palatable feed. If not kept under control, it will run to seed toward the end of November, the seed ripening in late December to early January. On light land soil types in Mid-Canterbury in a normal season a dormant period then ensues until the plants are revived by early autumn rains in March, when growth continues until checked by the hard frosts of winter. With good fertility in a mild season some growth is made right through winter.

Cocksfoot

Cocksfoot is slow growing during the first year, but once established makes excellent summer and autumn growth. It does not demand such a high level of fertility as does ryegrass, and, being deep rooted, it is better able to withstand drought. Indeed, during the last dry autumn it was the only grass in light land trials that produced much feed. Selective grazing prevents it from becoming dominant in a general mixture and often it does not show up until the ryegrass is checked by adverse conditions or grass-grub attack. If at any time it is desired to strengthen the cocksfoot in a mixed pasture, the area should be left ungrazed in spring and cut for hay or silage in late November or early December. The ryegrass will be checked and the cocksfoot will receive the full benefit of the available light and moisture at a time when it is ready to make its maximum growth.

Subterranean clover is a valuable plant for building up the fertility of light land.

As a special-purpose pasture cocksfoot is excellent, but it should always be the dominant species in a mixture sown for this purpose.

Crested Dogstail

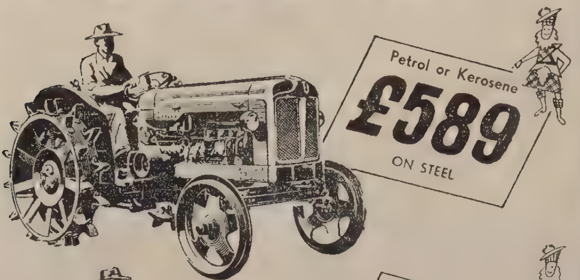
Though crested dogstail is not as robust as ryegrass and cocksfoot, it comes away earlier in spring, giving an early bite when fresh feed is so valuable. It is a very palatable grass and is often hard to find in a mixture, as it is readily grazed by sheep and usually kept down except when seeding. It reseeds readily and helps to fill in the bare spaces between the other grasses, thus keeping out some of the weeds that would otherwise take its place.

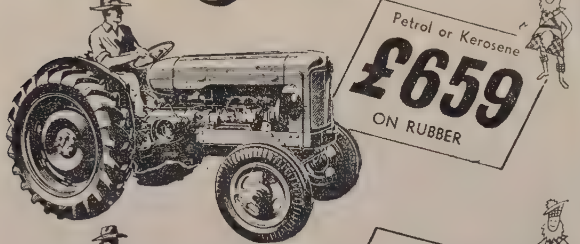
Short-rotation Ryegrass

Short-rotation ryegrass is another very palatable grass, but it demands a high level of fertility for the best results. On light land it does not generally last as a good pasture more than 1 year. It is useful as an autumn-sown greenfeed crop after a fallow, and is then very similar to Italian ryegrass in habit of growth.

Left—Perennial ryegrass forms the essential base of all general-purpose pastures. Right—Cocksfoot is one of the most valuable grasses on light land.

VALUE far above the price!

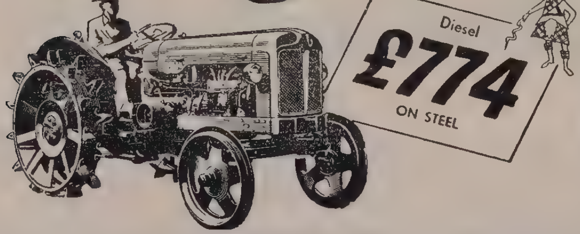


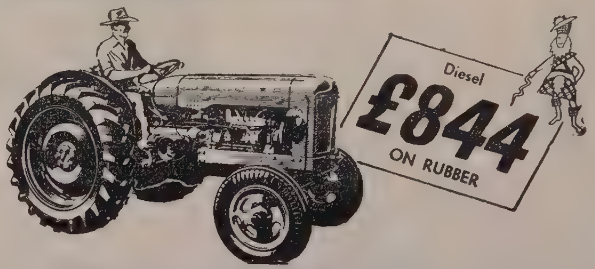


test-drive
the New
Fordson Major
on your
farm

Ask your Ford Dealer to bring a New Fordson Major out to your farm. Test it with your own implements, under your own conditions.

All Prices (delivered any Dealer town) include electric starter, lights, adjustable front axle, belt pulley, power take-off. (Optional equipment: hydraulic lift and linkage). One-third deposit and convenient payments for tractor and implements through confidential A.F.C. Purchase Plan. Prices and specifications subject to change without notice.

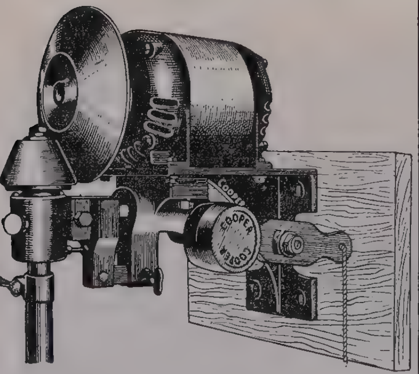




Write for literature and test-drive details to FORD MOTOR COMPANY OF NEW ZEALAND LIMITED LOWER HUTT 280.

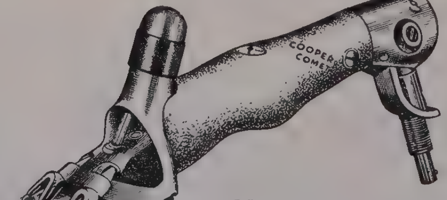
COOPER SHEEP SHEARING EQUIPMENT

Cooper Horizontal Type
Electric Friction Gear.



Once again this popular Cooper model is offered to the farmer with improvements. High grade, ½ h.p. motor. Single and three phase. Designed to give long service. Special electric grinders.

Cooper "COMET"
The new and Improved Handpiece.

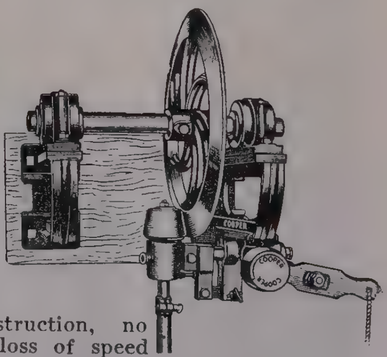


Meets every requirement of expert shearer or learner. Lighter in weight, lower in upkeep.

Also Cooper Combs and Cutters.

Fully illustrated pamphlet on request.

Cooper Friction Gear
The "Leader" Shafting Model.



Strong construction, no slippage or loss of speed or power. Trouble-free efficiency. Ball-bearings at all necessary points. Single or Double-ended ball-bearing grinders.

Manufactured in the Cooper Works in England for

THE COOPER ENGINEERING COY. (N.Z.) LTD., BOX 599 AUCKLAND.

DISTRIBUTORS THROUGHOUT N.Z. WRITE FOR THE NAME OF YOUR LOCAL AGENT.

Early sowing (in January) will give good autumn and winter feed, with gradual deterioration in spring. Later sowing (in March-April) will give some winter feed and the bulk of growth in spring. Though the times of maximum growth will vary with seasonal conditions, those mentioned are usually typical. Short-rotation ryegrass may be sown alone or with ryecorn or other greenfeed crops.

Subterranean Clover

Subterranean clover is one of the most valuable plants for building up the fertility of light land. Though it will grow on soils with a much lower level of fertility than is needed for other clovers, it responds well to good treatment. Being an annual, it should be allowed to grow well and set plenty of seed during the first year. Once there is a good seeding on the ground it will re-establish itself under any reasonable conditions.

There need be no fear of its becoming too aggressive, as once the fertility level is high enough, its place will be taken largely by white clover. A subterranean clover sward that is well established is often improved by cultivation after the seed has ripened. A few strokes with a hustler or stiff-tined grubber, with an oversowing of ryegrass, invigorates the pasture and increases the carrying capacity. In Mid-Canterbury the Tallarook variety has proved superior to Mt. Barker in the amount of grazing produced.

White Clover

There is a vast difference between the old, volunteer type of white clover, which appeared only in wet seasons, produced a little feed, and disappeared with the first dry spell, and the present Certified strain. The latter certainly does best under conditions of high fertility, but even on light land, provided it receives reasonable supplies of lime and phosphate, it will grow well and prove a valuable plant in a mixed sward. Apart from the fodder it provides white clover will also fix appreciable quantities of nitrogen in the soil, thereby assisting the growth of the grasses. White clover should be included in all general-purpose mixtures, even on the poorest land.

Lucerne stand which has made a good recovery after being grazed. Lucerne has proved suitable both for hay and for grazing.

Lucerne-cocksfoot has proved very successful. Part of a stand in its first year.

Montgomery Red Clover

Montgomery red clover is slower to establish and comes away later in spring than cowgrass, but has the big advantage of a much longer life. It gives its maximum growth throughout late spring and summer, providing useful fodder in that period when ryegrass, white clover, and subterranean clover have passed their maximum growth and before their autumn growth has begun. It does well in conjunction with cocksfoot, which has a similar growing period.

Lucerne

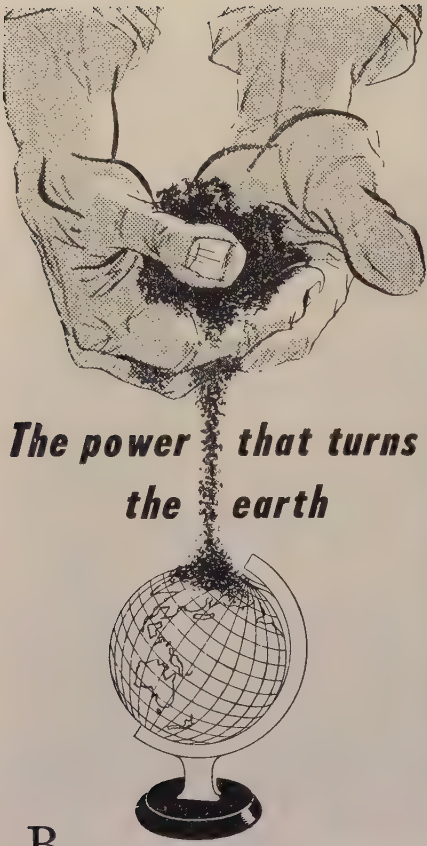
At one time it was thought that lucerne would grow only on certain types of soil, but though only a little experimental work has been done locally, farm practice has shown that provided adequate lime and phosphate are used, lucerne will grow well on a wide range of soil types. On light land it has proved very suitable both for grazing and for hay. If it is not required for one, it can readily be used for the other, according to the season and grazing requirements, as it is adaptable to both purposes. Lucerne requires more lime than does pasture and appears to do better when this is applied before sowing. It is better to apply the maximum requirement at this stage than part then and part a year later.

Lucerne-cocksfoot

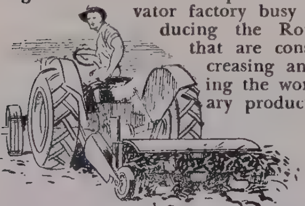
The combination of lucerne and cocksfoot has been well tried out in North Canterbury and has proved a great success. Mid-Canterbury farmers have been later in taking up the mixture, but it is now becoming popular. In some of the early sown areas too much cocksfoot was used and it has tended to become dominant at the expense of the lucerne. Farmers are now sowing less cocksfoot seed in the mixture with better results.

Where there is a tendency for the cocksfoot to become too aggressive it should be grazed very hard during winter, when the lucerne is dormant. It can also be used as a run-off from turnips with good effect. Lucerne-cocksfoot is sown primarily as a grazing mixture, but there is no reason why it should not be made into hay when the opportunity offers. Usually stock are not partial to cocksfoot hay, but if it is well mixed with lucerne they accept it more readily. Of course, the larger the proportion of lucerne is to cocksfoot the better the results will be.

If cocksfoot is already too dominant in a lucerne-cocksfoot stand, it is better to graze it the full season without cutting. Taking a cut of hay off any pasture containing cocksfoot is a good way to strengthen the growth of the cocksfoot.


The power that turns
the earth

BETTER cultivation methods have been man's constant aim since he first gained crops from the soil. And when Rotavator introduced complete cultivation with one implement men of many nations recognised its advantages at once. That's why the demand for Rotavator Power-driven Rotary Hoes has been so phenomenal. From the war's end to 1951—six short years—Rotary Hoes Ltd., of England, have supplied no fewer than sixty-five countries with these versatile machines—from the handy two horse-power Rotavators to the big powerful tractor driven models. And the demand is increasing all the time. It's this huge global need which keeps the large Rotavator factory busy . . . producing the Rotary Hoes that are constantly increasing and improving the world's primary production.



ROTAVATORS LTD

Representing the
World's largest
Manufacturers
of Rotary Tillage
Equipment.

P.O. BOX 705
PALMERSTON NORTH

Defeat MASTITIS
with
THE PENICILLIN TREATMENT FOR MASTITIS
REG'D TRADE MARK
VETSPEN CERATE
"100"
12 TUBES
12 TUBES
EACH TUBE PROVIDES ONE DOSE OF 100,000 UNITS OF
PROCAINE PENICILLIN
KEEP IN A COOL DRY PLACE
FOR VETERINARY USE ONLY
Registered Pursuant to the Stock Remedies Act, 1934
GLAXO LABORATORIES (N.Z.) Ltd., PALMERSTON NORTH

The standard dose pack of Vetspen Cerate contains 25,000 units of penicillin and costs 12/- per dozen tubes. For those obstinate cases use Vetspen Cerate "50" containing 50,000 units and costing 17/- per dozen; or for more intensive applications Vetspen Cerate "100" containing 100,000 units and costing 24/- per dozen. All are made with Glaxo procaine penicillin and are available throughout New Zealand.

VETSPEN CERATE

Insist on *The Glaxo Penicillin* **UDDER INJECTION**

A Service to the Land

The many branches of the National Bank throughout New Zealand offer a service of experienced financial counsel to farmer customers.

THE NATIONAL BANK
OF NEW ZEALAND
LIMITED

Established 1872

Grass-grub can be controlled by application of D.D.T. The area shown was topdressed with D.D.T. incorporated in fertiliser and the patches are those which were missed by the topdresser on turns.

Importance of Good Seed

The average farmer is convinced of the importance of sowing good seed, but there are still a few who prefer low-priced mixtures. Certification is a guarantee that the seed originated from a good strain and also that it has attained a certain standard of purity. Any saving made by purchasing seed of low quality is poor economy. The following seed mixtures are recommended and can be used as a guide for sowing on light land:—

General-purpose Pasture	**lb. per acre**
Perennial ryegrass	25-30
Cocksfoot	3-4
Crested dogstail	1-2
Subterranean clover (Tallarook)	2
Montgomery red clover	3
White clover	1-2
Dominant Cocksfoot	
Perennial ryegrass	10
Cocksfoot	8
Subterranean clover (Tallarook)	2
Montgomery red clover	3
White clover	2
Cocksfoot-lucerne	
Cocksfoot	2
Lucerne	12
Lucerne	
Lucerne	15

Drilling or Broadcasting

Usually it is better to drill pastures on light land than to broadcast seed, because the seed is placed closer to the fertiliser and to the moisture so essential for good germination. Some farmers drill the bulk of their seed down the coulters and broadcast a little at the same time. The new 3½in. coulters appear to have solved the problem of too wide spacing between the rows and are becoming more popular as they become better known.

All pasture seed-beds should be well worked and firm with the moisture near the surface.

Use of Heavy Rollers

Heavy rollers, first introduced into the Ashburton district in 1946, have been readily accepted and have proved invaluable. Most of the light land in Mid-Canterbury is stony, the size of stones varying considerably from district to district, from farm to farm, or even between different paddocks on the same farm.

At one time the largest of the stones were picked off and carted into heaps, the remainder being left. This was enough when the only things moving across the paddocks were livestock or slow-moving drays. With the advent of better pastures and the chance of harvesting a small seeds crop, coupled with the use of a motor truck for odd jobs, it became necessary to find some way of disposing of all large stones. The Cambridge roller proved too light, so the heavy roller was evolved.

The first of these was made of discarded steel tractor wheels welded together in pairs, suitably reinforced, and filled with concrete. It was very successful and other similar ones were soon in operation. Different ideas produced different types, and today a wide selection can be seen around the countryside. The basic materials range from the tractor wheels used first to discarded boilers filled with concrete, and finally to large driving wheels off steam traction engines. The rollers vary a little in weight, but average approximately 1 ton per foot of width. Apart from their initial use for burying the stones it has been found that the extra consolidation of the somewhat free soil also encourages better grass growth.

The usual practice is to roll in July or August while the ground is still moist and when root growth is starting to come away faster after winter. This consolidates the soil around the roots after any winter frost lift and assists pastures to re-establish after any mild grub damage. Rolling will not kill grass-grubs, except for a few very close to the surface, but it will help to minimise their effect.

Grass-grub and Grass Caterpillar

It is not intended to deal fully with grass-grub and grass caterpillar control, as that has been done by officers of the Entomological Research Station, Department of Scientific and Industrial Research, Ashburton. They recommend the application of 2lb. of 100 per cent. D.D.T. per acre with the phosphatic manure. The D.D.T. can be purchased separately and mixed by the farmer or bought ready mixed in the fertiliser. It must be mixed thoroughly and applied as near the surface of the ground as possible. Although this quantity may not kill all the grass-grubs, it will save the pasture for at least 3 years. Some farmers now apply D.D.T. with their seed in drills with good results, but it has been found that broadcasting the insecticide gives better surface cover and superior control.

Potentialities of Light Land

It is now accepted that the carrying capacity of light land in Canterbury can be greatly increased, though there are still a few who need to be persuaded that it is sound to spend time, money, and effort in this direction. No plan of farm improvement can depend on any one factor. On light land, lime and phosphate in heavy initial amounts are essential. So, too, are suitably proportioned pasture mixtures of good-quality seeds sown on a seed-bed prepared by thorough cultivation. A rotation that provides for two green-feed or root crops between ploughing up and sowing down helps to clean the ground and freshen it for the new pasture.

When extra stock are being carried adequate quantities of good hay, preferably lucerne hay, should be provided for times of shortage in the dry summer as well as for winter. Special-purpose pastures (cocksfoot dominant, lucerne-cocksfoot, and lucerne alone) all extend the season of growth and help to keep the flock thriving throughout the year.

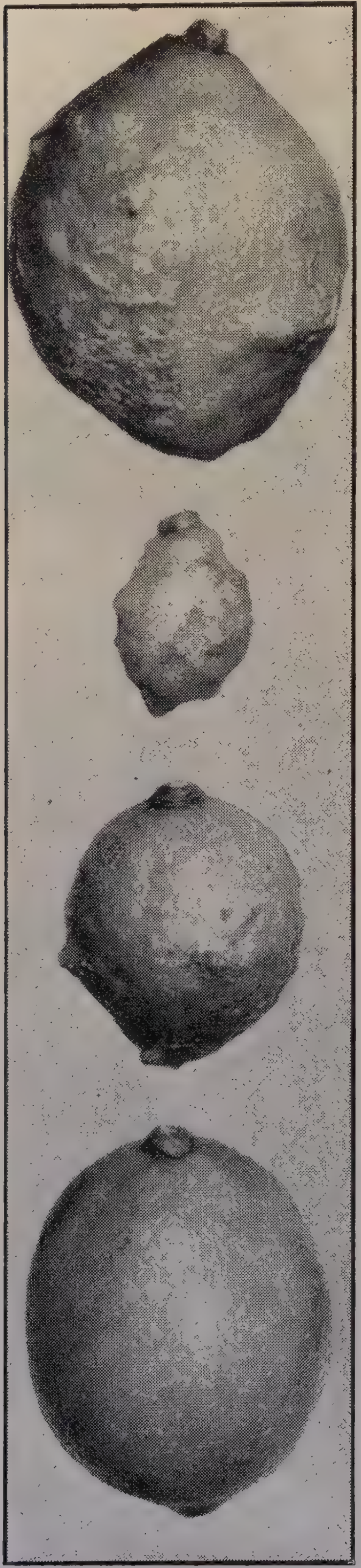
No large-scale improvement plan is simple to operate, but if progress is to be made, the land must be encouraged to produce its maximum while it is being built up and maintained to its optimum state of fertility. Development should be begun in a small way and expanded as quickly or as slowly as circumstances permit. That improvement is possible cannot be denied, for the potential is there.

Reference

"Soils of Ashburton in Relation to Irrigation", L. I. Grange.

Citrus Verrucosis and Bark Blotch

PRACTICALLY all kinds of fruit grown in New Zealand are subject to diseases of some description, and in that respect citrus fruit is no exception. Fortunately, good practical control can be secured over most diseases affecting citrus trees, but sometimes losses occur despite preventive treatments applied to control specific troubles. Failure to secure adequate control lies often in a grower's lack of knowledge of conditions governing infection and the correct timing of spray applications or other treatments. In this article by F. L. Bailey, Horticultural Instructor, Department of Agriculture, Tauranga, descriptions of the causes of two common diseases of citrus, verrucosis and bark blotch, are given, together with recommended control measures.



[Rendell's

Verrucosis on lemons (upper three), showing scabby pimples and irregular wart-like lumps, and a healthy fruit (bottom).

CITRUS trees generally are subject to the attacks of many diseases, which may be insect, fungous, bacterial, virus, physiological, or deficiency troubles. Of these the insect and fungous groups are responsible for most of the damage caused. Control of these troubles may be secured by the use of chemicals applied as sprays to citrus trees, or disinfectants to the wood or bark, and by attending to general orchard hygiene to reduce further infection.

The diseases with which this article deals belong to the fungous group; they are common diseases probably experienced at one time or another by all citrus growers. The losses incurred can be costly, particularly to growers new to citrus growing, if a fundamental knowledge of their cause and control is lacking.

Citrus Verrucosis

Citrus verrucosis (*Elsinoe fawcetti*) is a fungous disease which mainly affects lemons and is one of the major causes of fruit rejection at citrus packing houses. It is not often troublesome on other kinds of citrus grown commercially in New Zealand.

The fruits, and less frequently the leaves, of standard lemon varieties are affected; the Meyer lemon is subject to serious attack on both fruit and leaves. When worked on citronelle (rough lemon) stock the Meyer variety appears to be particularly susceptible to this disease.

Infection on the fruit first appears as small, raised, scabby pimples, which are yellowish, fawn, or light brown and about the size of a pinhead. As the young fruit grows the pimples enlarge and sometimes run together to form large, irregular warts which are unsightly and hard and rough to the touch. On the leaves the symptoms may appear either as small cones up to ½in. high with a yellowish scab on the tips or as rough, fawn, flattened areas on the surfaces of the leaves similar in appearance to coarse sandpaper. Infection is seldom noticeable on old wood, but on young shoots or laterals small, slightly raised, elongate, scabbed areas on the bark, of the same colour as those on the fruit and foliage, usually signify infection.

Conditions Governing Infection

From scientific investigation it appears that verrucosis hibernates in infected leaves, and from old leaf infections the disease is spread to newly set fruit and developing foliage. The fruit and leaves become progressively resistant with age and practically immune when the fruit reaches about 1in. in diameter and the leaves about 1in. wide. Mature fruit and foliage are immune, but if infection occurs in their early stages of growth, they can carry the fungus over, thus providing a source of infection for the next set of fruit and developing leaves and shoots.

The degree of infection seems to depend on humidity and temperature; it has been observed that infection is far more severe in citrus growing districts subject to humid atmospheric conditions when fruit and foliage are in their early stages of growth. Unless moisture is plentiful at the critical stage, infection does not occur. Fine weather during the flush of growth when fruit is setting and developing does not necessarily eliminate the chances of verrucosis infection, as heavy dews, which are not uncommon in spring in various parts of New Zealand, provide sufficient moisture to enable the fungus to develop.

Control

Verrucosis can be readily controlled by spraying with Bordeaux mixture at 3 : 4 : 50 strength, provided applications are correctly timed. As the most susceptible period of infection is in the very early stages of growth, protection must be given during those critical months to produce disease-free fruit. The blossoming period for lemons is spread over a considerable time, the main spring blossoming beginning toward the latter part of October; this time and the next 2 months are the most dangerous period for verrucosis infection.

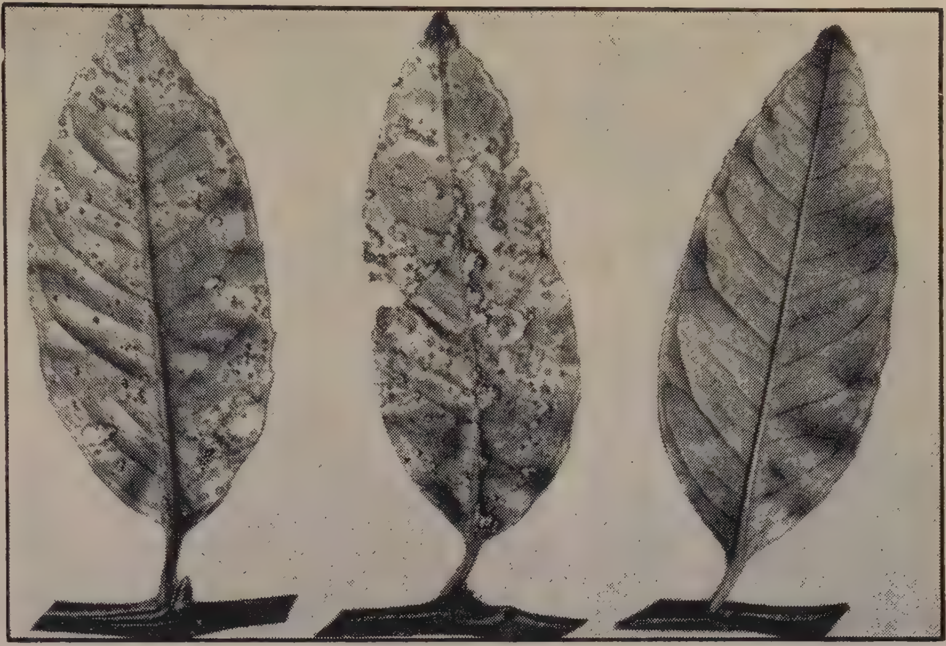
In orchards or districts where verrucosis is known to be severe, the first Bordeaux application should be made in early October. This application is called a pre-blossom spray and is more in the nature of an additional precautionary measure. During November and December fruit is setting and new growth is emerging, and to keep the newly formed fruit and growth free from infection Bordeaux applications should be made about late November and in early January. The latter applications may be applied to other citrus varieties as a precautionary measure and to control other fungous diseases to which they are susceptible.

On standard lemons fruit set in autumn appears less subject to verrucosis than that set during spring. No doubt the weather in spring influences the possibility of infection, but Bordeaux application in May will provide the necessary protection against infection.

Sometimes through change of orchard ownership or for other reasons spraying has been neglected and a severe infection of verrucosis has occurred. A grower faced with the problem of ridding his orchard of the infection should adopt the following procedure:—

1. Remove from the trees all (mature and immature) infected fruits and bury them.
2. Cut out diseased and dead wood and burn it. If necessary, lightly prune the trees to facilitate spraying operations and to ensure thorough spray coverage.
3. Maintain a strict spray programme when the preliminary operations have been completed.

Verrucosis infection does not affect the qualities of the fruit, juice, and pulp, but diseased fruits are not acceptable for marketing and are a loss to the commercial grower. The disease is not difficult to control and in citrus districts where verrucosis is troublesome the cost of correctly timed Bordeaux applications will be found infinitesimal compared with the loss that occurs when infection becomes rampant.



Verrucosis on young leaves (left and middle); healthy leaf (right). *[Rendell's*

Bark Blotch

Apart from diseases causing loss of crop there are several bark diseases of citrus which cause structural damage and even death of trees if remedial action is neglected. Of the bark diseases one of the most serious is bark blotch (*Ascochyta corticola*).

Unfortunately, early stages of bark blotch infection are inconspicuous and often growers are unaware of its presence on the trees before these show some yellowing of the foliage and general unthriftiness. Bark blotch occurs most frequently and seriously on lemon trees, but other kinds of citrus grown in New Zealand are affected. Generally, infection starts above the bud union on the lower parts of the trunk and main arms, sometimes travelling as high as 4ft. or 5ft. up the leaders. In the early stages infection may be recognised by light to dark brown patches of dead bark having slightly raised margins. Occasionally gumming is present around the infected areas.

Lemon tree affected with bark blotch recovering after treatment. At this stage the wound should be covered with a bituminous paint.

Usually infection spreads most rapidly upward, but slower lateral extension may encircle the trunk or main arms, causing a reduction in the sap flow, which in turn results in a change of colour of the foliage from a normal healthy green to a sickly yellow. In the later stages of infection the dead bark cracks and falls away, exposing bare wood.

The fungus probably gains entry into host trees through injury such as that caused by citrus borer or through mechanical injuries caused during cultivation and harvesting. Some growers believe that only old trees are subject to infection, but that is a wrong impression, as newly planted trees have been known to succumb to the trouble.

Conditions Favouring Spread

The spread of the disease is fostered by damp, shady conditions, often brought about by tall weed growth around the trunks or by mulching material piled up against them. Under such conditions the bark softens, is unable to dry out properly, and is in a condition suitable for the disease to thrive. In new plantings fairly serious infection has been known to occur in young trees planted in areas where they have been damaged by frosts. Often cover crops are planted in young citrus orchards to build up soil fertility. A cultivated square or circle is kept around each tree during winter and the cover crop between the trees is allowed to grow for turning under early in spring. A "pocket" is created around each young tree, and in localities where frosts may occur the frost lodges in these pockets. When of sufficient intensity it causes damage by splitting the bark of the tree trunks, resulting in wounds through which the bark blotch fungus can enter.

Spraying Programmes

COMPLETE spray schedules for the control of citrus fruit diseases and pests in New Zealand are included in Department of Agriculture Bulletin No. 20, "Recognition and Control of Pests and Diseases in New Zealand", which is available free from offices of the Department of Agriculture.

Early Treatment Essential

Where bark blotch appears in an orchard a careful inspection of all trees should be made and appropriate treatment carried out on infected trees as soon as possible. Preventive measures such as periodical hoeing to stop weeds from growing up around the trunks of trees should not be neglected. Care should be taken that all bulky organic material used for mulching is placed about 1ft. clear of tree butts to allow air to circulate freely around them.

[*Rendell's*

Indiscriminate use of disinfectant can cause severe damage. Disinfectant was painted over the whole trunk and main arms of this tree as a precaution against bark blotch. Only infected areas and immediately surrounding bark should be treated.

Lesions discovered before they develop far may be treated successfully and the tree saved. Where difficulty is experienced in finding the extent of infection, dirt or moss adhering to the trunk or limbs may be removed by using a stiff brush, which should be dipped frequently in a disinfectant solution to prevent the spread of infection to sound tissue. When the deposit has been removed the infected area will show up, usually as an irregular dark brown patch surrounded by healthy greenish tissue. The infected area should then be painted with a recommended disinfectant fluid, which penetrates the diseased tissues, destroying the fungus. Horticultural Instructors will advise orchardists on the most suitable disinfectant fluid to use. Fluid should be applied only to the infected areas and the bark immediately surrounding them, not painted over the whole of the trunk and lower portions of the tree.

New bark tissue soon develops under at least part of the previously affected bark. With bad infections several applications of disinfectant at monthly intervals may be necessary to secure full control.

Some time after the disinfectant has been applied longitudinal cracking occurs followed by a general loosening of the bark covering the treated area. At that stage the flaked bark may be removed and burnt and the wound treated with a wound dressing compound, preferably a bituminous paint, which should be renewed from time to time to give protection until exposed wood is completely covered with new bark.

Free Bulletins for the Citrus Orchardist

Nos.

20 Recognition and Control of Citrus Diseases in New Zealand.
96 Lemon Culture.
206 How to Establish a Citrus Orchard.
241 Culture of New Zealand Grapefruit, Oranges and Mandarins.
285 Grafting of Fruit Trees.
303 The Propagation of Citrus Trees.

The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

Depreciation and loss of trees through bark diseases are a major problem to citrus growers. Early diagnosis and treatment are essential if good yields of quality fruit are to be maintained. That can be achieved only by careful and intelligent management and by keeping trees free from structural damage.

Reference

"Fungous Diseases of Fruit Trees", by G. H. Cunningham.

☆

Holding Power of Staples in Creosoted Posts

THE opinion of some farmers and other rural workers that creosoting of posts weakens the holding power of staples is supported by the results of tests described in an article by H. R. Orman, Timber Physics Officer, Forest Research Institute, in "Forest Products Research Notes" of October 1952. Creosote was found to reduce the holding efficiency of shear staples in treated posts by 25 per cent., but this loss could be effectively overcome by increasing the shear staple size by ½in.

Tests were carried out on untreated totara (*Podocarpus totara*), creosoted larch (*Larix decidua*), creosoted Douglas fir (*Pseudotsuga taxifolia*), and creosoted Corsican pine (*Pinus laricio*).

The creosote loadings in larch and Douglas fir were above average, but it is not considered that the results are materially affected by higher absorptions.

Staples tested for holding power were 1in. barb, 1in. shear, 1½in. shear, and 2in. shear.

There are two principal ways in which a staple can be loaded when under test: (i) Statically, when the load is applied gradually and steadily; (ii) Under impact, when the load is applied very suddenly.

Staple efficiency is considered to be mainly static in practice, for although it is probable that some of the forces tending to cause withdrawal of the staples in service may be applied suddenly or with impact, these forces will usually be applied to the fencing wires, with the result that the indirect forces at the staple, because of wire give and stretch and movement through the staple, will not be true impact.

Static holding power or withdrawal resistance was therefore taken as the best indication of staple efficiency.

Results of Tests

(a) Of the three species Corsican pine, larch, and Douglas fir, the last two, in general, hold staples better than Corsican pine. Untreated larch and Douglas fir are similar or only slightly superior to untreated totara.

(b) Creosote affects shear staples to the same extent (a reduction of 25 per cent. in holding power) independent of staple size.

(c) Increasing the shear staple in size causes a marked increase in staple efficiency for all untreated wood; the increase is also apparent in treated wood, although the increases are not quite so marked. However, this feature can be taken advantage of by using, for instance, 1½in. staples in place of 1in. staples in treated wood. Increasing the staple by ½in. effectively overcomes the loss of 25 per cent. in staple efficiency in creosoted wood; use of 1½in. staples in place of 1in. staples in treated timber causes an actual average increase of 27 per cent. over the figure for 1in. staples in untreated posts.

(d) A notable anomaly is the very low value for barbed 1in. staples compared with the shear type of staples. In general, 1in. shear staples have an average increase of 61 per cent. over 1in. barb staples in untreated timber; in treated timber the average increase of shear over barb is only 13 per cent. In untreated larch the 1in. barb staple has only 55 per cent. of the holding power of 1in. shear. In treated larch the holding power of the 1in. barb is increased by 20 per cent. (in Douglas fir and Corsican pine there is no significant increase), but although the holding power of the shear is decreased by 24 per cent. in the treated post, it is still 14 per cent. greater than that of a barbed staple in similarly treated wood.

The holding power of the barbed staple is considerably reduced because of the ruptured fibres that surround the staple shank. The barbed staple is apparently more effective when it is used in creosoted timber because the barb does not rupture the wood fibres to the same extent due to the oily nature of the creosote.

Recent Research Work

PHOSPHATIC FERTILISERS

SOIL fertility investigations form a large proportion of the field experimental work carried out by the Extension Division of the Department of Agriculture and over 600 pasture topdressing trials were in operation at the end of March 1953. Soil analyses are of considerable assistance in the giving of fertiliser advice to farmers, but they require constant checking against the results of field experiments, and an increased demand for soil testing will increase rather than diminish the need for field trials.

NAURU ROCK PHOSPHATE

ABOUT 50 trials are being conducted. In some of the trials finely ground Nauru rock phosphate is applied at 3cwt. and 10cwt. per acre initially followed by annual dressings of 3cwt. per acre, and in other trials at 10cwt. per acre initially with no further dressings. Five of these trials are mowing trials and 45 are observational. In all but one of the mowing trials Nauru rock phosphate at 10cwt. per acre is significantly better than when applied at 3cwt., but is not superior to 3cwt. of superphosphate. In observational trials general indications are that there is very little difference between 3cwt. and 10cwt. of finely ground Nauru rock phosphate, and superphosphate seems almost everywhere better than Nauru rock phosphate at either rate.

—*C. DURING*

* * * *

WANGANUI AND RAETIHI TRIALS

OBSERVATIONAL trials on Wanganui steep sandy mudstone surface-sown country (Whangaehu loam) have shown medium responses to phosphates, with superphosphate slightly superior to other forms. Nauru rock phosphate gave fair results only, with 10cwt. per acre only slightly better than 3cwt. per acre. On a drained grit pan swamp (Rahotu loam) at Raetihi marked responses to phosphates and potash were obtained. Superphosphate proved the most useful phosphate fertiliser, but was closely followed by North African phosphate. Nauru phosphate at 3cwt. and 10cwt. per acre was the least efficient. On rolling country (Ohakune silt loam) good responses were obtained from phosphates, with superphosphate and North African phosphate giving the best results. There was very little response from Nauru rock phosphate at 10cwt. per acre.

—*A. A. DUNCAN*

* * * *

HOROWHENUA TRIALS

OBSERVATIONAL trials comparing phosphatic fertilisers on Kiwitea loam at Manakau east and on Patea sand at Ohau west have shown superphosphate and North African phosphates to be the best, but only slight responses have been obtained from finely ground Nauru rock phosphate either at 3cwt. or 10cwt. per acre.

—*J. M. HOPKINS*

* * * *

"THERMOPHOS"

IN 6 mowing trials "Thermophos" (a fused calcium magnesium phosphate) when applied at equivalent rates of phosphate per acre has given responses similar to or slightly better than superphosphate. In 12 observational trials in the North Island on soils derived from volcanic ash it has given promising results in comparison with superphosphate. In the South Island superphosphate has been better than "Thermophos" in a few cases.

"METAPHOS"

In 3 replicated mowing trials "Metaphos" (calcium metaphosphate) has given responses equal or almost equal to those of superphosphate, but it has been slightly slower acting and the responses took longer to reach their maximum than did those of superphosphate. In 22 observational trials "Metaphos" was applied at half the rate of superphosphate. As "Metaphos" is a very concentrated fertiliser, this rate still gives about 40 per cent. more phosphate than does superphosphate. In a few of these trials in North Island hill country "Metaphos" has given slightly better responses than superphosphate. In 15 other trials it has been equal or slightly inferior to superphosphate.

DOUBLE SUPERPHOSPHATE

In 2 mowing trials double superphosphate plots have yielded similar pasture production to those of superphosphate when the two fertilisers were applied at equivalent rates of phosphate. In 10 observational trials double superphosphate was applied at half the rate of superphosphate; this gives a slightly heavier phosphate dressing on the double superphosphate plots and in most of these trials double superphosphate has given similar responses to superphosphate. In 3 recent trials in Southland, however, superphosphate appears better than double superphosphate even when applied at equal rates per acre, which gives more than twice the phosphate dressing on the double superphosphate plots. Such results are possibly indicative of sulphur deficiency, as superphosphate contains nearly half its weight as calcium sulphate. These indications are being followed up by further trials.

POTASH

Applications of various rates of potassic fertilisers are included as treatments in about 70 topdressing trials. Many of these trials have been in progress for only a short time, so results are insufficient for reliable conclusions. From 6 trials in north and central Taranaki it appears that 1cwt. of muriate of potash per acre each year is the maintenance requirement under most conditions. Where the initial potash level of the soil is low 1 to 2cwt. of muriate of potash may be required in the first year. Similar results have been obtained on pumice soils near Rotorua.

A few trials on the light land of the Waikato (Horotiu sandy loam) indicate that initial dressings greater than 2cwt. of muriate of potash per acre and higher maintenance dressings thereafter may be necessary on potash-exhausted fields. In many trials potash applications without adequate dressings of phosphate have depressed pasture growth.

A trial on the water-sorted ash soils of the Karaka complex and one on the Waitemata complex south of Auckland showed quick fading of the beneficial effect of 2cwt. of muriate of potash per acre. In these trials 4cwt. of this potash fertiliser was needed to maintain a high level of pasture production over the whole year. Trials on the ironstone country of Northland have indicated a definite but less extreme potash deficiency which is corrected by dressings of 1 to 2cwt. of muriate of potash per acre.

A number of trials on peats and peaty soils show that these soils are practically always potash deficient. Potash requirements vary, however, according to the type of peat and degree of admixture with mineral soil and no general recommendation regarding rates of application can be made to cover all types of peats.

—*C. DURING*

FOR ADVICE OR SERVICE ON

C.A.V.

FUEL INJECTION EQUIPMENT

WRITE, 'PHONE or TELEGRAPH from North to South

Whangarei Engineering Co.,
Whangarei. Phone 2639

Joseph Lucas (N.Z.) Ltd.
75-77 Beach Road,
Auckland. Phone 34-330 (3 lines)

Joseph Lucas (N.Z.) Ltd.,
Unity Buildings,
Hamilton. Phone 1618

Joseph Lucas (N.Z.) Ltd.,
Grey Street,
Tauranga. Phone 1010

Joseph Lucas (N.Z.) Ltd.
Commerce Street,
Whakatane Phone 724

L. M. Silver & Co. Ltd.,
263, Victoria Avenue,
Wanganui. Phone 2632

L. M. Silver & Co. Ltd.,
King Street,
Palmerston North. Phone 5989

L. M. Silver & Co. Ltd.,
Jervois Quay,
Wellington. Phone 54-555

Wooff & Salvesen Ltd.,
17-19 Lichfield Street,
Christchurch. Phone 37-607

A. M. Duncan
34 Latter Street,
Timaru. Phone 1594

Wooff & Salvesen (Dunedin) Ltd.
260 Cumberland Street,
Dunedin Phone 13-642

Ross Mitchell Ltd.,
Don Street,
Invercargill. Phone 930

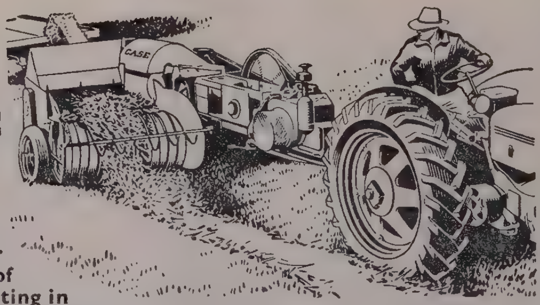
An idle diesel is Capital locked up—Keep your Capital working

MARATHON
Look for this Trade Mark when you Buy Gumboots—it means long wear!
MARATHON Gumboots

Made by:—
MARATHON RUBBER FOOTWEAR LTD.
A Manufacturing Division of Skellerup Industries Ltd.,
Christchurch.

One Man Bales your Hay

CASE Automatic Baler



Here's help for the labour problem during the rush of haymaking! One man, sitting in comfort on your tractor, can bale all your hay with a Case Automatic Baler. Automatically tied to stay tied with strong twine, Case-built bales are neat, square-cornered, firm—easy to stack, store, ship, and feed or sell. No longer need your hay quality and feed value deteriorate under sun and rain while you wait for custom crew. With the easy-to-own, easy-to-run Case Automatic Baler you're set to go the instant your hay is ready. Get complete details from your distributor.

It pays to farm with CASE

DISTRIBUTORS

JOHN CHAMBERS & SON LIMITED
Sole N.Z. Agents, Auckland, Wellington, Christchurch, Dunedin, Invercargill, Timaru, Hamilton, Palmerston North, New Plymouth, Ashburton, Nelson, Whangarei, Hastings, Oamaru.

G 5463.9

Preventing Bees from Swarming

Seasonal Notes for the Domestic Beekeeper

By T. P. J. WILLIAMS, Apiary Instructor, Department of Agriculture, Hamilton

WHEN honey and beeswax were obtained from frameless box and straw skep hives by the killing of the bees after they had gathered a crop of honey swarming was very necessary, as new swarms were needed to replace those colonies destroyed. These conditions have been reversed by modern beekeeping, for the honey crop may be secured without the colonies being destroyed or a single bee being killed. Every effort is now made to prevent swarming, and beekeepers have evolved methods of swarm control.

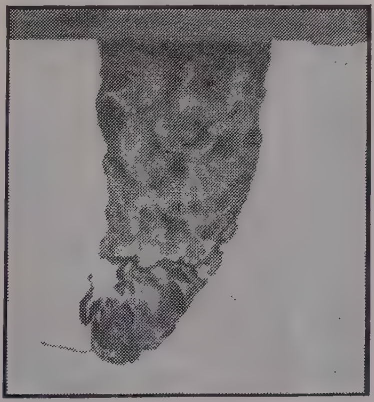
BEEKEEPERS who desire to secure as much honey as possible prefer to prevent bees from swarming, their aim being to conserve the strength of the hives so that the maximum number of bees will be available to gather the main flow of nectar. If hives can be prevented from swarming, they will usually lose all desire to do so when the main honey flow begins, and the bees will concentrate on the gathering of nectar.

The beekeeper should always remember when dealing with swarming that he is trying to curb a natural instinct of the bees, and for this reason swarming will always remain a major problem, despite the many methods of swarm control.

Colonies of bees in their wild state are destroyed by bee diseases and in bush fires, floods, and the like, so that it was necessary that Nature made some provision for them to propagate and preserve their race. It was necessary not only for the reproduction of individuals within the colony, but for the reproduction of entire colonies of bees. Swarming is therefore a division of the colony for the purpose of reproduction.

Causes of Swarming

The beekeeper must be able to recognise and check conditions which encourage bees to develop the swarming fever. This may be caused by an overcrowded condition of the hive, lack of suitable ventilation, an aged queen, or an abundance of drones. The beekeeper should be able to eliminate these causes, but one factor over which he has no control is the weather. Climatic conditions have a definite influence: A mild spring encourages the colony to build up in strength too rapidly, with the result that it becomes crowded long before the honey flow begins. A sudden change in the weather stops the flow of nectar and at the same time forces field bees to remain in the hive, crowding the brood chamber.



The birth of a queen bee.

Aged Queens

If the hive has an aged queen, it should be requeened, for colonies headed by young queens are less prone to swarm than those with older queens. The bees will not tolerate a failing queen for very long and soon rear young queens either to supersede the old queen or to swarm. A failing queen will not be so evident in early spring, but as the colony approaches the honey flow the old queen is not able to do the work required of her and her egg-laying powers become depleted. It has become generally accepted among beekeepers that a queen needs replacing after her second season, and some beekeepers requeen each year.

Domestic beekeepers should aim to requeen their hives with a good Italian strain of bee, preferably from a recognised commercial queen breeder. If the beekeeper breeds his own queens, they should be bred from colonies which seem to show little or no desire to swarm.

Congestion of the Brood Nest

Colonies having ample comb room for brood rearing are less inclined to swarm than those cramped for room. The hive may have two supers, but because frames of honey are not kept to the outside of the box, they act as barriers to the queen, who restricts her brood nest to too small an area. The brood nest should be kept free at all times and a readjustment of frames may be necessary. Combs of honey should be placed to the outside of the hive, capped brood may be removed to the centre of the bottom box, and any empty combs should be brought up into the top box and placed beside those occupied with brood. The queen is then induced to expand her brood area.

It is of great importance to have only good worker combs in the brood nest. Combs containing a large amount of drone cells should be removed; otherwise large numbers of drones will be reared. Any drone brood within the hive should be destroyed by cutting off the tops of the cells with a knife. This can be done fairly simply, as capped drone brood protrudes beyond worker brood. This will reduce the number of drones which would be useless to the colony.

Extra Ventilation

If the bees show a tendency to cluster at the entrance, it indicates that the hive is poorly ventilated, and extra ventilation should be provided. It is extremely difficult for the bees to ventilate the hive properly if the entrance is too small. Strong colonies should be given full-sized entrances, and sometimes in a very hot climate the front of the hive may be wedged up an inch or two from the bottom board.

[*Green and Hahn*

A swarm of bees clustered on the branch of a tree.

Destroying Queen Cells

Once the bees have developed the swarming fever it will be necessary to make an examination of the brood chamber once in every 8 to 10 days. Any queen cells that may have been built should be destroyed, either by being cut out with a knife or squashed with the hive tool. Queen cells resemble a peanut shell; they are numerous and are usually constructed along the lower edges of frames or from any irregular surface of the comb. Great care will have to be taken when searching for them, as they are easily overlooked. If each comb is shaken free of bees before it is examined, there is little chance of a queen cell being missed.

In this way swarming may be prevented, and if all the other factors mentioned have been taken care of and extra supers added as required, the beekeeper may have no more trouble. However, if a colony still persists in building queen cells, the beekeeper should remove 2 or 3 frames of brood and replace them with empty worker combs. The brood may be given to weaker colonies. Where more drastic treatment is needed all brood may be removed from the hive and replaced with empty combs.

If it is found that the hive has swarmed, an examination of the brood nest should be made and all queen cells except one destroyed. The hive should then be left for about 3 weeks, and if another examination is made, it will probably be found that a young queen is laying. If this is not the case, the hive will most likely be queenless and should be requeened without delay or given a frame of unsealed brood with which to rear a new queen.

Overhead Irrigation

is cheapest and easiest . . .

Where channel digging and the supplying of water are not practicable, the Buckner is the definite solution to irrigation problems. The giant nozzle rotates evenly, drenching the land from above to a diameter of up to 375 feet. That is 2½ acres. Smaller models are 240ft. (1 acre) and 280ft. (1½ acres).

BUCKNER

low cost irrigation for large areas

The whole irrigator is precision-machined of highest quality brass and bronze and long, continued hard usage is assured. Let us explain more fully the wide adaptability of the Buckner on your property.

Write for full information.

Brown Bros.
ENGINEERS LTD.

Pumping Machinery Specialists since 1908.
590 Colombo Street, P.O. Box 548J,
CHRISTCHURCH.

HARDWOODS FOR FARMERS

We specialise ex stock or indent, railed or shipped anywhere.

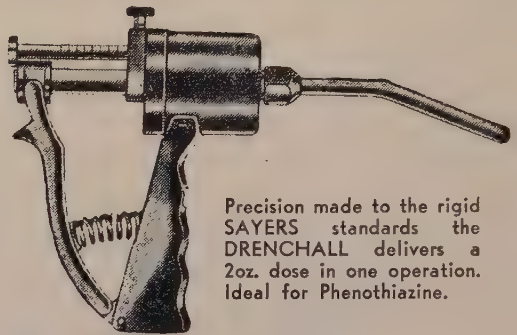
THE C. & A. ODLIN TIMBER & HARDWARE CO. LTD.,

Wellington, Petone, Palmerston North, Hastings, Napier, Gisborne, Tauranga, Newmarket, Otahuhu, Glen Eden, and Nelson.

Sayers INSTRUMENTS

. . . ease of operation, dependability, efficiency made SAYERS INSTRUMENTS world famous — the DRENCHALL is a worthy example.

2oz. DRENCHALL PISTOLET



Precision made to the rigid SAYERS standards the DRENCHALL delivers a 2oz. dose in one operation. Ideal for Phenothiazine.

Enquire for full range of SAYERS VETERINARY INSTRUMENTS from distributors

DALGETY & CO. LTD.
Branches throughout New Zealand

TRADE MARK
GREATEST GRIP—LONGEST LIFE
GREATER ECONOMY

★ **added constructional advances that mean maximum tyre performance in the worst conditions**

DUNLOP
NEW ZEALAND
LIMITED

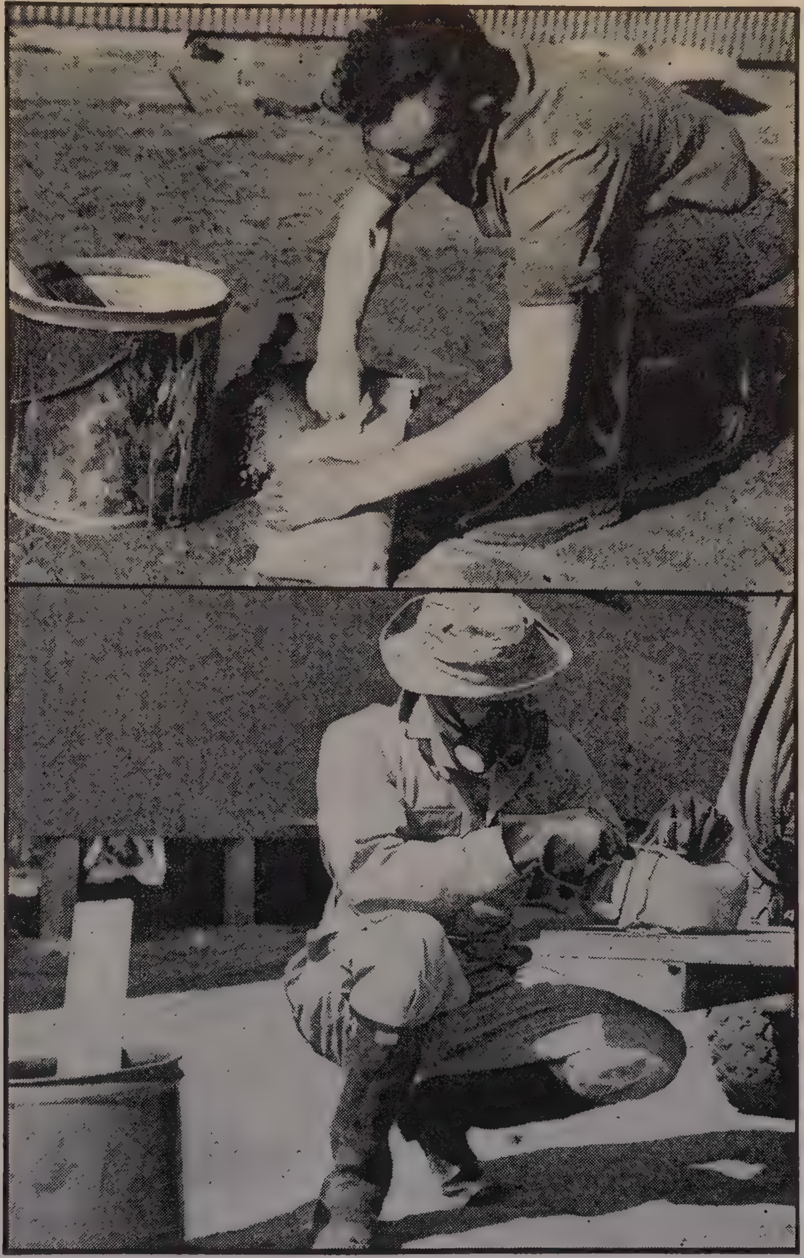
DUNLOP
FARM TRACTOR TYRES

Ask the man who uses Dunlop!

DTT.1.9

Precautions with Organic Phosphorus Insecticides

BECAUSE of the wide use by commercial growers and home gardeners of plant therapeutants, the dangers of these preparations and the precautions necessary when handling them were dealt with by H. Jacks, Plant Diseases Division, Department of Scientific and Industrial Research, in the July 1952 issue of the "Journal". In this article he gives more information about the organic phosphorus insecticides in view of the increased use of them.



Wrong way (upper) and right way (lower) of opening containers of phosphorus insecticides

ORGANIC phosphorus compounds are formulated as wettable powders ("Thiophos", etc.), as water miscible preparations ("Isopestox", H.E.T.P., T.E.P.P., etc.), and as emulsifiable concentrates (parathion or E605, "Fosferno", "Folidol", "Murphos", E.P.N., "Metacide", "Malathon", "Pestox 3", "Hanane", etc.).

Symptoms of Poisoning

Symptoms of poisoning may occur during the period when an operator is exposed to toxic concentrates and diluted spray formulations or some hours afterward. Loss of appetite, nausea, headache, dizziness, restlessness, and twitching of muscles are early symptoms of poisoning. Tremulousness, apprehension, excessive sweating, and salivation may be followed by vomiting, abdominal cramp, etc. Of grave importance are evidence of respiratory distress, effusion of fluid into the lungs, and convulsions, which may be followed by loss of consciousness. Constriction of the pupils to pinpoint size with disturbance of vision sometimes occurs.

Mild effects of poisoning, which show as headache, loss of appetite, nausea, or increased fatigue, are often ignored or attributed to other causes. If due to poisoning, they could be accompanied by a significant reduction of cholin esterase (an enzyme connected with normal functioning of the nervous system).

Absorption of organic phosphorus insecticides occurs readily through the skin, by inhalation, and by ingestion. Dangerous amounts of these poisons may be absorbed as a result of accidents, or by carelessness, or by poisoning due to repeated intake of small amounts which may result **from failure to appreciate and observe carefully the recommended precautions.** Generally, growers regard the use of respirators and protective equipment as "sissy".

A person who has experienced poisoning by organic phosphorus compounds may be more susceptible to further exposure within a period of 2 to 8 weeks. On no account should such a person be further exposed until the period of recovery has elapsed.

Poisoning may occur when the spray mixture is being prepared or applied. Mild symptoms of poisoning such as headache and nausea may be claimed by people who fear poisoning through working with organic phosphorus compounds, and tests for blood cholin esterase estimation will be necessary to investigate such claims. If these compounds are handled properly, the health hazard to users is very slight.

Precautions

Inhalation and skin absorption as means of poisoning are the major aspects to be considered and the following precautions are recommended to avoid accidents.

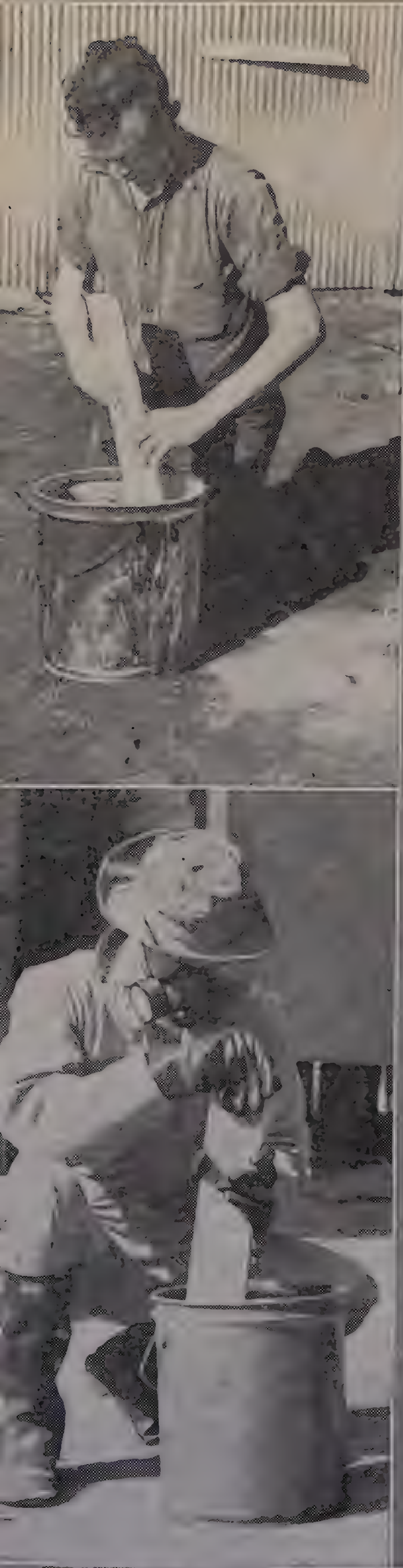
Formulating and Packaging

Protective clothing such as aprons, gloves, and boots should be worn and should be cleaned daily. Respirators must be worn.

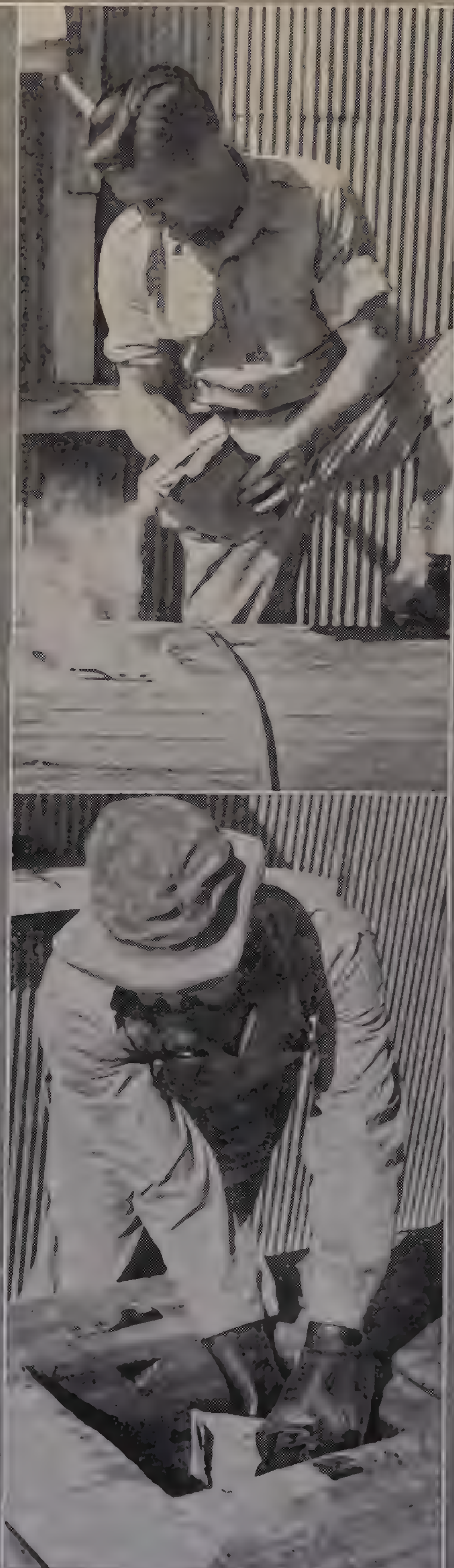
Vapour or dust hazards should be reduced to a minimum by ventilation and by installation of exhaust fans.

Contact of liquid with the skin must be avoided. If such contact occurs, contaminated parts must be washed with soap and water and if possible a mild alkali should be added to the water to encourage hydrolysis of the compound. Atropine may be administered to affected persons, and medical

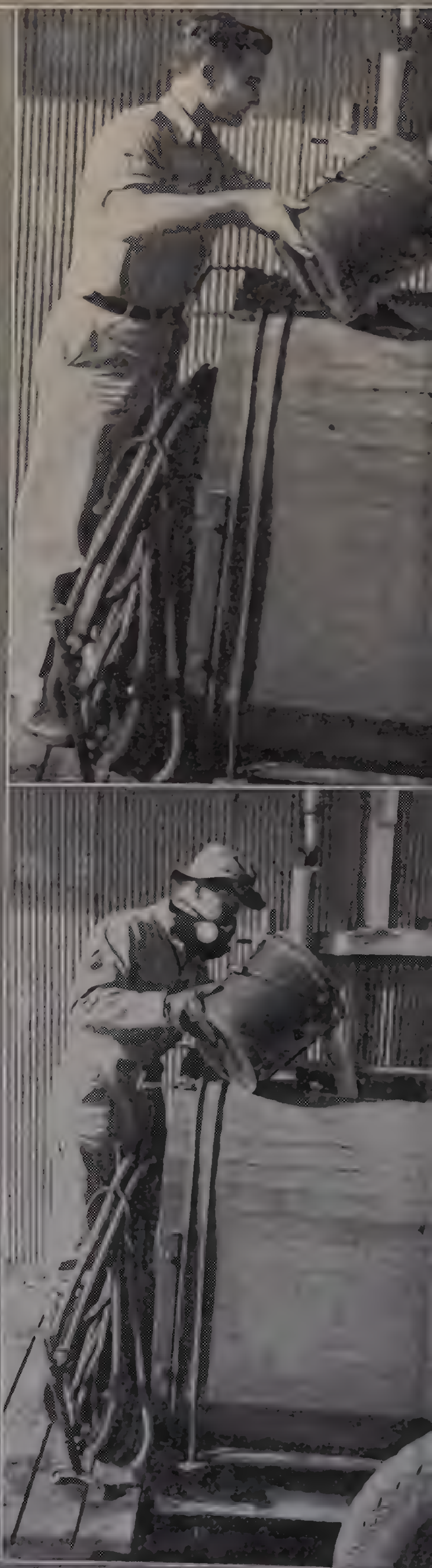
Handling Organic Phosphorus Insecticides



Preparation of spray mixture. Operator exposed to hazards (upper) and operator wearing protective clothing (lower)



Adding wettable powder to spray tank. Operator exposed to hazards (upper); correct method of adding powder (lower)



Adding spray concentrate to tank. Wrong way (upper) and correct way (lower) of adding concentrate aid should be sought. Affected persons must not return to work until permitted to do so by a doctor.

Contaminated clothing must be removed immediately after spraying and should be washed before it is used again.

Adequate facilities for washing must be provided. Strict attention must be paid to washing before meals and at the end of working periods.

Smoking, eating, and drinking must be prohibited when these insecticides are being handled.

Spillage on floors should be covered with sawdust or earth and later removed and buried. The floor should then be scrubbed with a solution of washing soda (1lb. in 3 gallons of water). If concentrate is spilt on the soil, the contaminated area should be dug up and the soil should be removed and buried.

Implements used for spraying should be washed with a solution of washing soda and water and rinsed with clean water.

Labelling

Containers holding phosphorus insecticides must be labelled clearly. The word **Poison** should appear on the label and recommendations for the safe handling of the compounds, first-aid treatment, and methods of disposal of containers should be given.

Recommendations to Growers

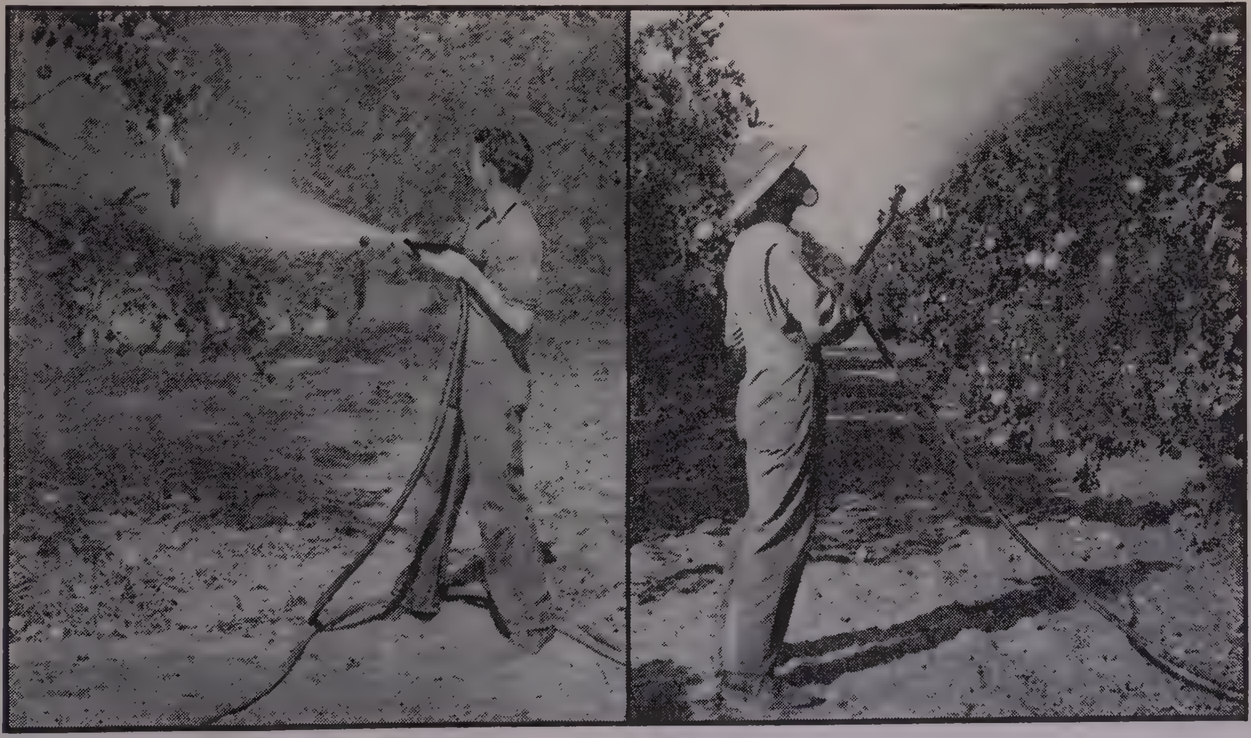
Store containers in a safe, cool place under lock and key and away from food.

Keep containers tightly closed.

Use overalls or an old suit, natural rubber boots, natural rubber gloves, apron, and face mask or respirator when handling concentrate.

Open containers with care to avoid splashing. If concentrate is spilt on the skin or is splashed into the eyes, wash it off immediately with warm

Above—Disposal of combustible containers by burning (left) and of tins by burying (right). Below—Operator exposed to spray hazards (left) and protected (right).

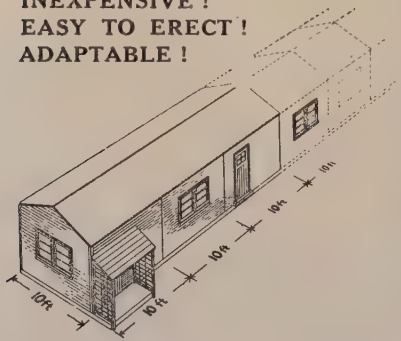


UTILITY

BUILDINGS

PREFABS WITH INTERCHANGEABLE STANDARD SECTIONS

INEXPENSIVE !
EASY TO ERECT !
ADAPTABLE !



Farmers—you can now erect your shearers' quarters, sheds, stores, barns, etc. with unskilled labour. **UTILITY Buildings** are designed in 10ft. prefabricated sections—ends and sides being interchangeable. Complete with gable roof and erection plans.
20ft. wide models for larger requirements.

USE COUPON FOR DETAILED INFORMATION

To:—

BARR-BROWNS LTD.
Gracefield Road, Lower Hutt.

Please send me details of UTILITY Buildings.

10ft. wide x .... long

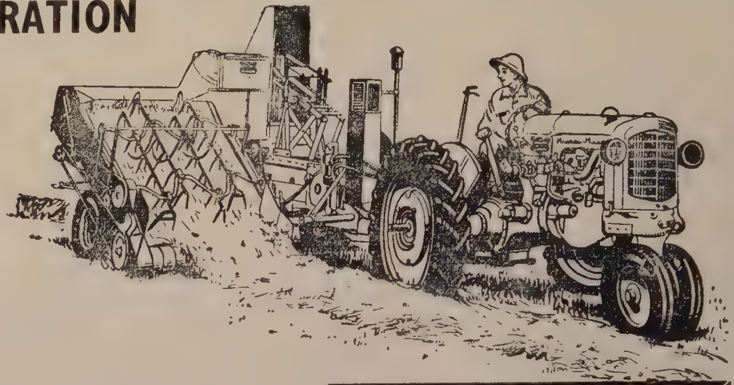
20ft. wide x .... long

Name ....

Address ....

JA2

Make HAY BALING a profitable ONE-MAN OPERATION with



MINNEAPOLIS-MOLINE

MM

BALE-O-MATIC

LIFTS automatically
SLICES uniform size
TIES with two wires
BALES straw or hay

IMMEDIATE DELIVERY

One-man operation. Picks up hay, slices it, wire-ties it. Adjusts itself automatically to all field conditions. Handles heavy or light crops equally well. Bales up to 10 tons per hour. Sturdy, efficient. Can also be used as stationary baler without adjustment. Be ready for the coming season—get full details now of this amazing money and labour saving machine. **Write for MM Bale-O-Matic Catalogue.**

N.Z. Distributors:
TODD MOTORS LTD.
Wellington.

Dealers everywhere.

AFTER JUST ONE YEAR !

USERS *everywhere* ACCLAIM

"Our work is severe..."

"We confidently recommend..."

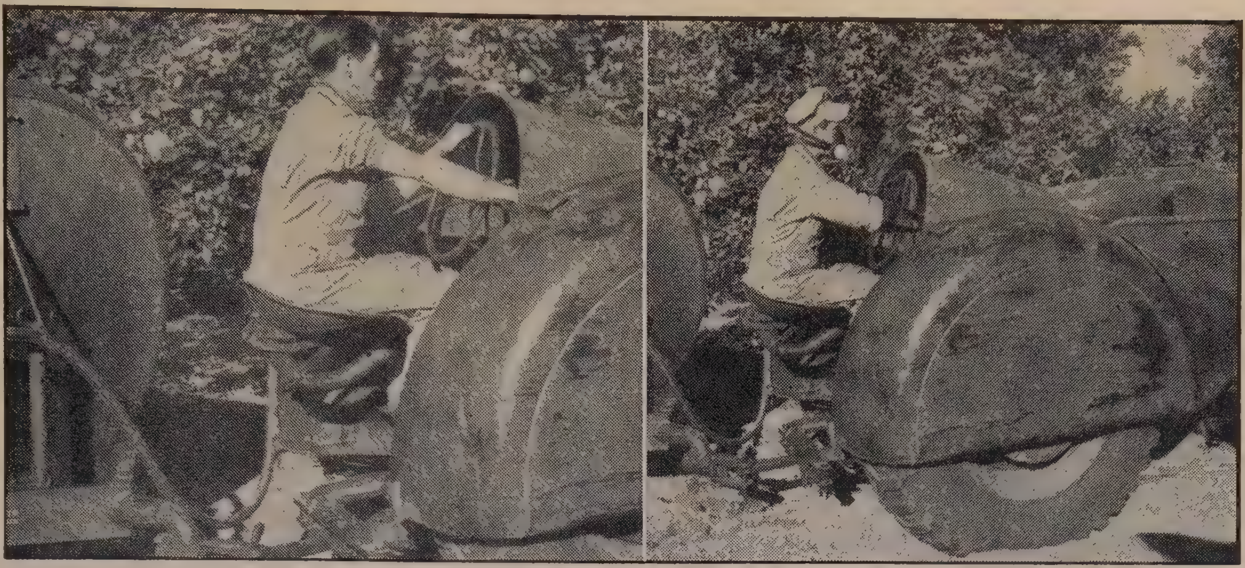
"Used exclusively . . ."

"No lubrication worries . . ."

SHELL
X-100
MOTOR OIL

The oil that prolongs engine life because it
FIGHTS ACID ACTION–
proven major cause of engine wear!

The Shell Company of New Zealand Limited (Incorporated in England). X15.3D



Tractor driver exposed to spray drift (left) and protected (right).

water. Inform a doctor immediately. Remove clothing immediately if it becomes contaminated by concentrate. If skin is contaminated, wash it well. Wash affected clothing before wearing it again.

Wash hands thoroughly after using phosphorus insecticides, particularly before eating or smoking.

Measure and mix the spray out of doors.

Remove soil on which spillage has occurred and bury it.

Do not eat, drink, or smoke when handling phosphorus insecticides or where they are being handled.

Destroy all containers by burning or burying to avoid accidents to children and animals.

Avoid exposure when filling a spray tank by wearing protective clothing.

Wear natural rubber gloves with gauntlets, natural rubber boots, overalls, and sou'wester when spraying fruit trees, hops, and tall crops. When spraying low-growing crops use natural rubber boots and natural rubber gloves. When spraying in glasshouses use natural rubber gloves and natural rubber boots and respirator. Occasional contact with spray drift when operating with the dilutions recommended for normal high-volume spray need not cause anxiety. Continued exposure to spray drift is, however, dangerous. Tractor drivers should wear complete protective clothing and respirators or visor-type helmets. Where practicable tractors should be fitted with air-conditioned, gas-proof cabs or have a removable canopy to reduce spray drift hazards.

Avoid spraying in windy weather.

Do not clear blocked jets by blowing them out with the mouth.

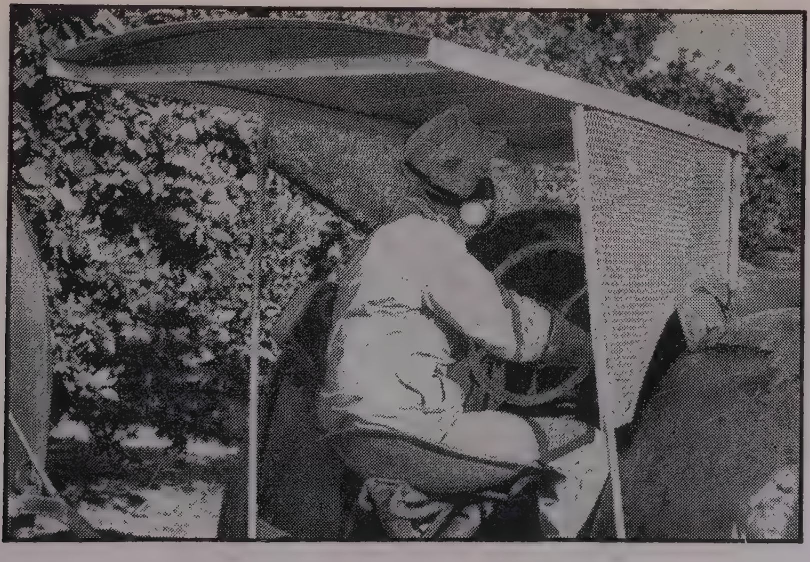
Wash out thoroughly all equipment with water containing a wetting agent and soda.

Do not let spray drift on to people or animals in the neighbourhood. Warn people on adjacent land before spraying an area.

Do not apply materials other than H.E.T.P. and T.E.P.P. within 4 weeks of harvest, to avoid toxic residues.

Discard left-over spray mixtures by emptying tanks into holes dug in the ground and take care not to contaminate streams.

Do not handle fruit or foliage for 4 days after spraying with materials other than H.E.T.P. or T.E.P.P. Harvesting should not be undertaken for 14 days after spraying. Post signs warning people against entering the contaminated area during the danger periods already specified.



Removable canopy protecting tractor driver from excessive exposure to spray drift.

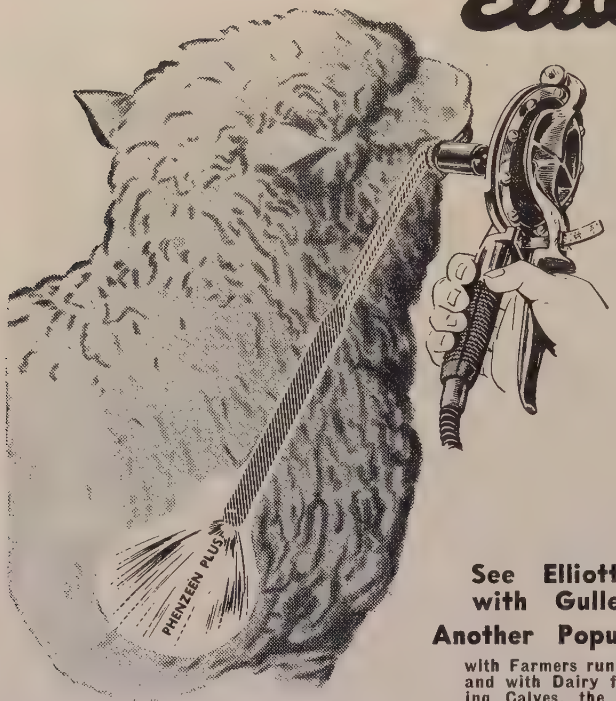
Conclusions

Organic phosphorus insecticides have been used in large quantities in home gardens and in commercial practice. They are highly toxic compounds and their use calls for the greatest care to avoid accidents. There is, however, no reason to regard them as too dangerous to use. Accidents which have occurred were the result of ignorance and lack of precautions. If proper protective measures are taken, there is little danger from their use.

Preparation of this material would have been impossible without reference to the published work of other researchers in this field too numerous to mention individually but to whom acknowledgment is made.

All photographs by Florida Citrus Experiment Station.

Elliotts PHENZEEN PLUS DRENCH TECHNIQUE



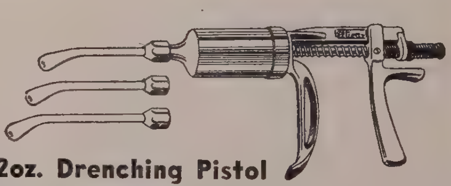
with the NEW BA6-C gullet tube conveys PHENZEEN PLUS direct to the sheep's gullet.

- ★ Action as simple as normal drenching.
- ★ Tube slips **easily** and **quickly** direct to gullet.
- ★ Because the tube conveys drench direct to gullet **no swallowing** is necessary.
- ★ No swallowing of drench means absolutely **no slobbering.**
- ★ No slobbering means full dose and **no staining** of wool.
- ★ Full direct dose **kills the worms**—and
- ★ No staining means clean wool and **no waste.**
- ★ Rubber tube protects sheep from injury.

See Elliotts famous BA6-C Automatic Drenching Gun with Gullet Tube, at your Stock & Station Agents

Another Popular Favourite

with Farmers running smaller flocks, and with Dairy farmers for drenching Calves, the Dub-ell-dose pistol administers a full 2oz. dose of Phenzeen Plus at one shot and can be supplied with 4, 5 and 6in. nozzles.



ELLIOTTS DUB-ELL-DOSE 2oz. Drenching Pistol

Marketed by Elliotts N.Z.
Company, Ellco Ltd.,
Edinburgh St., Onehunga,
Auckland.

Before purchasing your new milking machine COMPARE THE WALLACE SUPER for price and all-round quality !

As a result of an extensive market survey on dairy farmers many improvements have been incorporated in the Wallace Super Milker. These are features the farmer himself has suggested—they will appeal to the practical sense of every farmer.

PRICES INSTALLED, BUT NOT INCLUDING ELECTRIC MOTORS

Releaser Models	2 COW	3 COW	4 COW	5 COW	6 COW
Single Unit - -	**£156**	**£177**	**£200**	**£228**	**£250**
Double Unit -	**£180**	**£214**	**£253**	**£288**	**£322**

Quotations on Request for Mechanical Releaser and Milk Pump Units

Wallace SUPER MILKERS

D. McL. WALLACE LTD.
Head Office: Newmarket, Auckland.
Branches at Whangarei, Dargaville, Hamilton, Te Aroha, Matamata, Thames, Whakatane, New Plymouth and Stratford. Agents throughout New Zealand.
South Island Representative: T. H. Phipps & Son, Box 722, Christchurch.

10 Features in Every Wallace Super Milker

1. It eliminates hand stripping, yet gets all the milk from every cow. 2. It milks cows quickly. 3. It is gentle in action. 4. It is simple in design to facilitate cleaning and maintenance—all useless gadgets are eliminated. 5. It is efficient to operate without frequent adjustments becoming necessary. 6. It incorporates the latest improvements which have been tested and found 100% efficient. 7. It is reliable, so that 10 years hence it will operate as efficiently as when installed without incurring heavy maintenance costs. 8. It spells quality—both in workmanship and clean-cut, streamlined finish. 9. It is backed by a comprehensive New Zealand-wide after-sales and spare-parts service. 10. It is reasonable in price—in line with Wallace's policy to keep prices down.

AVAILABLE NOW for Cash or on Easy Terms

Establishing and Managing a Household Poultry Flock

ESTABLISHMENT and management of a household poultry flock are quite simple, involving little expense and much common sense. Some beginners set out with the impression that the more fowls they keep the better, but their chances of success would be considerably enhanced if they were to begin in a small way, learn the rudiments of poultry farming, and build up their flocks gradually on sound lines. In this article for the backyard poultry keeper, H. K. Mullins, Poultry Instructor, Department of Agriculture, Hastings, stresses some of the points necessary to maintain an adequate supply of eggs the year round.

Perching pullets, bought annually as replacements, should come from farms where the young stock is reared on free range.

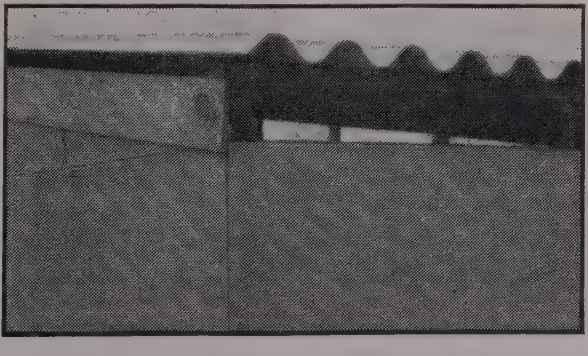
A SMALL house 8 to 10ft. square will accommodate 15 adult fowls quite easily. An outside run is not essential, particularly where space is limited, and if ample greens are supplied to the birds each day, little can be achieved by giving them a run which will eventually become stale and unsanitary. A 6ft. 6in. stud in front, with a fall of 1ft. to the back, will provide sufficient height to permit both maximum sunlight and freedom of movement. The front of the house can be open to within 2ft. 6in. of the ground or, according to the locality and climate, left open with the netting continuing right to the bottom plate. The roof, which can be of corrugated asbestos, aluminium, or iron, should have an overhang of at least 2ft. in front and approximately 6in. at the back. This will to some extent prevent the rain beating in and ruining the litter.

A concrete floor, which is both sanitary and permanent, reduces the risk of disease. If an outbreak of disease occurs, a concrete floor is easily cleaned out and sprayed with a suitable disinfectant such as washing soda. Straw, wood shavings, or both make an excellent litter for the floor, which should be maintained at a depth of from 4 to 6in.

The perches, which are usually constructed from 3in. by 2in. timber, should never be nailed down, but made in such a way that they may be lifted out for cleaning. Red mite, which are found in the best of fowl-houses, frequent the cracks and crevices on the underneath sides of the perches, and if these are nailed down, it is difficult to apply a suitable vermicide such as perch paint or creosote to the places requiring it most. If broken eggs are to be avoided, plenty of suitable nests must be provided. These are usually 12in. wide, 14in. deep, and 12 to 14in. high. One nest should be provided for every 5 birds at a height of about 3ft. from the floor.

Feeding

There are various way of feeding poultry, but a balanced diet is most important for birds of all ages. The most common and probably still the best method is to give wet mash in the morning, greens at midday, and a good feed of grain in the evening. Ordinary mash has not sufficient protein in it to maintain consistent production through winter, and extra meat meal should be added to the mash or better still supplied free in a hopper so that the birds can help themselves and thus balance their own diet. Scraps such as bread, potatoes, or any other left-overs can be included in the mash.



A method of providing back ventilation for a laying shed.

Purchasing Young Stock

When a flock, no matter how small, is being established all birds should be purchased from those commercial poultry keepers who breed only from vigorous and disease-free stock. Serious losses can occur in chickens bred from stock which has not been blood-tested for pullorum disease. Nearly all commercial farmers avail themselves today of the facilities offering to combat this disease and under the New Zealand Poultry Flock Improvement Plan it is compulsory. If perching pullets are procured each year, little risk from pullorum disease is involved. These are usually bought at from 8 to 10 weeks of age and though the financial outlay is considerably greater, the rearing difficulties are practically eliminated.

Breeds to Keep

There are several breeds of poultry which are first-class producers and of these probably the Australorp and crossbreds are the best winter producers. The White Leghorn has the advantage of being non-broody and in milder climates will do particularly well. Rhode Island Reds are a good dual-purpose breed, but owing to their slow maturity they must be hatched in July or August. Rhode Island Red and Australorp females mated to a White Leghorn cockerel produce a cross which is rapidly becoming the most popular "breed" with commercial poultry farmers, particularly in the North Island. Whatever the chosen breed, however, only sound management and feeding will ensure an adequate supply of eggs during winter.

Culling

For economic reasons it is essential to cull systematically the year round. There is no special month or age for this to be done; it must be a regular feature from the day-old stage. Chickens with crooked toes, twisted hocks, or any other deformity can never be profitable producers and should be destroyed. Young chickens should feather and grow rapidly. Any which appear to be lagging behind the rest will never be economic to keep and should be disposed of as culls. These birds are weaklings and as such are likely to contract diseases first.

thus menacing the remainder of the flock.

Retaining hens for a second laying season is probably not as profitable as maintaining an all-pullet flock in these days of high food costs. However, for various reasons many prefer to do so, with the result that it is necessary to preserve eggs for use during May and June.

Preserving Eggs

If it is intended to preserve eggs from the household flock, only infertile eggs should be used. Once the breeding season is over all male birds should be disposed of as soon as possible. All eggs for preserving should be examined carefully for bloodspots, cracks, and thin shells by being held over a strong torch in a darkened room. The whole lot may be spoilt by one or two breaking or going rotten in the tin or box. There are several reliable preservatives on the market which can be used in either a liquid or paste form.

Free Bulletins for the Household Poultry Keeper

Nos.

- 239 Curd Feeding to Poultry.
- 318 Pullorum Disease.
- 319 Coccidiosis in the Poultry Flock.
- 327 Internal and External Parasites of Poultry.
- 331 Symptoms and Control of Fowl Pox.
- 332 Tuberculosis of Poultry.
- 336 Household Poultry Keeping.

The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

Disease Control

Several diseases can affect the household poultry flock. One which can be found on the best of farms is round worm infestation. These worms, which affect birds from 10 weeks of age to 12 months, can seriously retard growth and production. Consequently it is sound practice to deworm the young stock at 10 weeks and again at 4½ months. By doing so the resistance of the stock to all diseases will be increased. Carbon tetrachloride has proved effective in expelling round worms from the intestines and can be procured in capsules for the convenience of the household poultry keeper. The recommended dose is a 1 c.c. capsule at 10 weeks and a 2 c.c. capsule for each bird at 4 to 5 months. These can be procured from most chemists. Two-year-old hens have a natural resistance to round worms and need not be dosed.

◆

A. and P. Show Dates

THE following are dates and venues of A. and P. shows up to the end of January:—

NORTH ISLAND

November

*6 and 7 November—Manawatu and West Coast A. and P. at Palmerston North.

7 November—Tokoroa A. and P. at Tokoroa.

11 November—Thames Valley A., P., and H. at Te Aroha.

*13 and 14 November—Wanganui A. and P. at Wanganui.

13 and 14 November—Whangarei A. and P. at Whangarei.

14 November—Waihi A. and P. at Waihi.

*20 and 21 November—Egmont A. and P. at Hawera.

21 November—Bay of Islands P. and I. at Waimate North.

26, 27, and 28 November—Auckland A. and P. at Auckland.

27 and 28 November—Stratford A. and P. at Stratford.

*28 November—Kaikohe A., P., and H. at Kaikohe.

December

*5 December—Helensville A. and P. at Helensville.

5 December—Hauraki A. and P. at Paeroa.

January

1 January—Nuhaka A. and P. at Nuhaka.

4 and 5 January—Rotorua A. and P. at Rotorua.

*15 and 16 January—Wairoa County A. and P. at Wairoa.

16 January—Marton District A. and P. at Marton.

23 January—Central Hawkes Bay A. and P. at Waipukurau.

26 and 27 January—Feilding Industrial A. and P. at Feilding.

28 and 29 January—Hawkes Bay Ram Fair at Hastings.

29 and 30 January—Horowhenua A. and P. at Levin.

*30 January—North Kaipara Agricultural Association at Paparoa.

SOUTH ISLAND

November

5 November—Ashburton A. and P. at Ashburton.

*11, 12, and 13 November—Canterbury A. and P. at Christchurch.

*18 November—North Otago A. and P. at Oamaru.

20 and 21 November—Nelson A. and P. at Nelson.

21 November—Waimate A. and P. at Waimate.

21 November—Taieri Agricultural Society at Outram.

21 November—West Otago A. and P. at Kelso.

24 and 25 November—Otago A. and P. at Dunedin.

28 November—Motueka A. and P. at Motueka.

28 November—South Otago A. and P. at Balclutha.

28 November—Winton A. and P. at Winton.

December

1 and 2 December—Gore A. and P. at Gore.

5 December—Tokomairiro A. and P. at Milton.

5 December—Wyndham A. and P. at Wyndham.

12 December—Otago Peninsula A. and P. at Portobello.

January

9 January—Blueskin A. and P. at Waitati.

16 January—Waikouaiti A. and P. at Waikouaiti.

23 January—Palmerston and Waihemo A. and P. at Palmerston.

*27, 28, and 29 January—Southland A. and P. (Royal Show) at Invercargill.

* The Department of Agriculture exhibit will be staged at this show.

FOR NORTH ISLAND CUSTOMERS—

Waerenga Wines

Produced by the Te Kauwhata Horticultural Station

Madeira Port Apple Claret

In case lots: 2 gallons in 12 bottles.
Cases can be supplied in any assortment required.

PRICE £3/16/- PER CASE,

including rail freight from Te Kauwhata to the nearest officered railway station. Cheques should include exchange.

Orders may be placed at the following offices of the Department of Agriculture: AUCKLAND, DANNEVIRKE, GISBORNE, HAMILTON, HASTINGS, HAWERA, KAIKOHE, KAITAIA, MASTERTON, MATAMATA, NEW PLYMOUTH, PALMERSTON NORTH, PUKEKOHE, ROTORUA, STRATFORD, TAUMARUNUI, TAURANGA, TE AWAMUTU, TE KAUWHATA, TE KUITI, THAMES, WAIROA, WANGANUI, WELLINGTON, WHANGAREI.

Dahlias Brighten Flower Garden in Summer and Autumn

NO flower garden seems complete unless dahlias, with their bright showiness during summer and autumn months, are present. These plants are easily grown and propagated and give a good display both in borders and as cut flowers. In this article for the flower gardener R. R. White, Horticultural Instructor, Department of Agriculture, Dunedin, discusses some of the problems involved in the growing of dahlias. Routine flower garden work for November is dealt with by H. P. Thomas, Horticultural Instructor, Department of Agriculture, Wanganui.

THE dahlia was so named to commemorate the work of the Swedish botanist Dr. Dahl. The genus contains a number of species indigenous to the sandy plains of Mexico. The modern dahlia bears little resemblance to the parent species used by hybridists. The first three species used were *D. variabilis*, which has purple or red flowers, *D. coccinea*, a scarlet, and *D. mercki*, lilac and yellow. Another, *D. juarezi*, which was introduced in 1872, gave rise to the cactus varieties. In the early nineteenth century the tubers were tried as vegetables in Paris and some were sold on the city markets of Britain as Jerusalem artichokes. Though rich in nutritive matter, they were never grown as a market garden crop. The dahlia was adopted in the latter half of the nineteenth century as a show

[*Douglas Elliott*

A fine specimen of a large formal decorative dahlia.

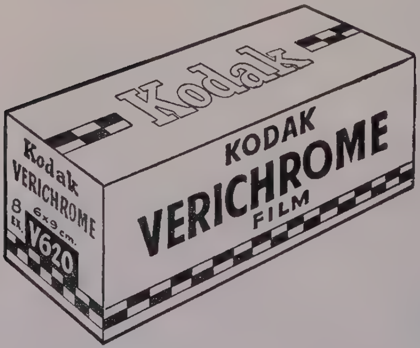
BELOW: Three types of dahlia, comprising from the left pompon, medium semi-cactus, and medium formal decorative. Douglas Elliott photo.

The best pictures are made on

KODAK

Film

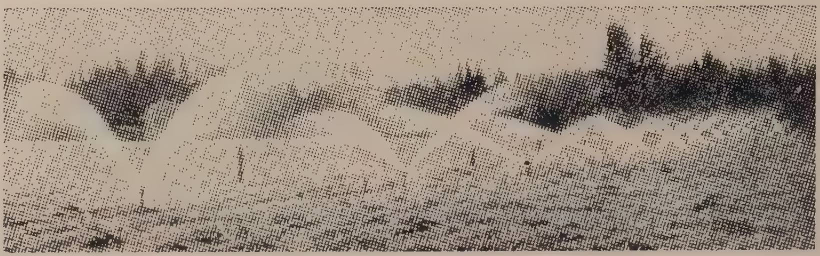
Kodak is the film you can **always** depend on—for fine pictures, sparkling and clear, full of detail.



From all Chemists, Kodak Dealers and

KODAK New Zealand **LTD.**

292 Lambton Quay, Wellington.
162 Queen Street, Auckland.
168 Colombo Street, Christchurch.
162 Princes Street, Dunedin.



BISLEY'S SPECIALIZE IN

LOW, MEDIUM AND HIGH PRESSURE SPRAY IRRIGATION

FEATURES:—
Pressure lock couplings which reduce labour by 50 per cent.
Tow-a-line fittings (a tractor can tow a pipe line in one length)
Non-Corrosive, lightweight Aluminium Alloy tubing
High pressure rainers for square area, full and part circle watering
Complete range of reliable pumping units.

We will inspect your property and give you our recommendations without obligation.

Write today for full information on the most modern irrigation equipment on the market. Designed and approved by the W.R. Ames Company of California, U.S.A.

A. M. BISLEY & CO. LTD.
HAMILTON AND CHRISTCHURCH
Branches and Agents Throughout New Zealand

FLY

ACROSS COOK STRAIT
with
YOUR CAR

If you are planning a trip to the other Island and need your car, ring the local railway station for a booking by RAIL-AIR.
RAIL-AIR will fly you and your car between Paraparaumu and Blenheim in 30 minutes; between Paraparaumu and Nelson in 45 minutes. No delay, no damage . . . if you wish you may drive your car on and off the plane yourself.

- **During the Christmas and New Year holidays, when surface transport is congested, RAIL-AIR will take your car across Cook Strait!**

Enquire Today About the Modern Inter-Island Car Ferry

★ RAIL-AIR ★

flower, but the stems were weak and the flowers hung downwards. It was not until 1913 under the auspices of the National Dahlia Society and the Royal Horticultural Society that the first trial was conducted to select varieties suitable for garden flowers. From then on the dahlia became extremely popular for garden use until today it is one of the most popular flowers grown.

Classification

For those wishing to exhibit dahlias a classification list was produced jointly by the Dahlia Society and the Royal Horticultural Society Committee. As the dahlia is a member of the *Compositae*, it has two types of florets: Ray florets, namely the outer ones which have coloured petals, and disc florets, which form the central disc and have no petals. It is on these features that the classification is based.

1. **Single dahlias:** Those not exceeding 4in. in diameter and with a single outer ring of ray florets and a central disc.

2. **Star dahlias:** These are small and with two or three rows of nearly pointed ray florets not or scarcely overlapping at their more or less recurved margins and forming a cup-shaped flower with a central disc.

3. **Anemone-flowered dahlias:** These have an outer ring of flattened ray florets surrounding a dense group of tubular florets which are longer than the disc florets in single dahlias.

4. **Collarette dahlias:** These have one or more rings of flat ray florets with a ring of small florets (with collar) approximately half the length of the ray florets.

5. **Peony-flowered dahlias:** These have flowers consisting of two or more rows of more or less flattened ray florets with central discs.

6. **Formal decorative dahlias:** These have fully double flowers showing no discs. All the ray florets are regularly arranged, the margins of the florets are usually slightly incurved, more or less flattened towards the tips which may be broadly pointed or rounded.

7. **Informal decorative dahlias:** These have fully double flowers showing no discs. The ray florets, which are not regularly arranged, are broad, with margins very slightly rolled backwards, more or less flat or slightly twisted.

8. **Double show dahlias:** These have fully double flowers over 3in. in diameter, almost globular with central florets, like the outer but smaller; florets have margins incurved, tubular, short, and blunt at the mouth.

9. **Pompon dahlias:** These have flowers like those of double show dahlias but smaller.

10. **Cactus dahlias:** These have flowers fully double, with the margins of the florets rolled backwards for not less than three-quarters of their length.

11. **Semi-cactus dahlias:** These have fully double flowers, with florets broad at the bases, and margins rolled backwards or twisted for less than three-quarters of their length.

12. **Miscellaneous dahlias:** Any which do not fall into the foregoing sections.

13. **Dwarf bedding dahlias:** Plants usually do not exceed 24in. in height.

Staking can be effective yet inconspicuous, as is shown with this single variety, The Bishop of Llandaff.

Dahlias are ideal for massed display against a background of shrubs.

The flowers may belong to any of the foregoing sections.

Propagation

Seed Sowing

Dahlias, particularly the small bedding types, can be raised from seed. During July or August seed can be sown in a box of good seed mixture consisting of 2 parts of loam, 1 part of sand, and 1 part of peat or leafmould to which has been added 1½oz. of superphosphate and ¾oz. of lime per bushel of mixture. The seedlings when about 1in. high can be pricked off into a box containing a suitable pricking off mixture at a spacing of about 3in. each way. Alternatively the seedlings can be planted direct into small pots. The seed sowing method must be used when a new variety is required incorporating various characteristics of two suitable parents.

Cross pollination to raise new varieties can be done as follows: The central disc florets are removed with a pair of forceps, the ray florets with the female parts of the flower being left intact. The pollen is placed on the pistils of these flowers. The flower can be covered with a paper bag and labelled to indicate the cross. The pollen bearing flowers should be picked 2 days before pollination and stood in deep water to ensure that the pollen is not dried up.

Division of Tubers

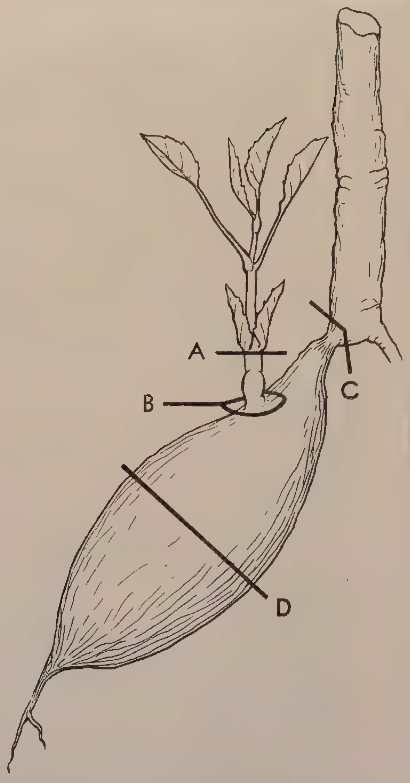
The clumps of tubers can be broken up, but this method usually restricts the number of new clumps, as many eyes and tubers are damaged. The best method is to place the clump in a box or in some warm spot so that it starts into growth. When shoots begin to appear the tubers can be separated with a long sharp knife, each one being cut off with one or more shoots. These can be planted out in their flowering positions in the border, care being taken to see that the young shoots are not damaged.

Cuttings

Where a clump of tubers is too small for suitable division the best method of propagation is by cuttings. The plants should be started into growth and when the shoots are 3in. to 4in. above the surface they should be cut off with a sharp knife and trimmed to make a cutting. The cutting can then be inserted in a compost containing sharp sand and left until it has rooted. Rooted cuttings should not be left in the compost longer than necessary, as they tend to make rapid root growth which may be damaged during lifting, and other cuttings nearby may be disturbed. The rooted cuttings can be potted up into 4in. pots, a suitable potting compost being used. The potted plants can then be grown on until they are ready for planting out.

Preparation of the Soil

As dahlias are gross feeders, it is necessary to give the soil adequate preparation before they are planted out. Dahlias do well in most soils provided that there is plenty of humus or compost worked in. They like a sunny situation which is not too exposed to winds. A dressing of superphosphate, sulphate of ammonia, and sulphate of potash can be applied together at the rates of 2oz., 1½oz., and 1oz. per square yard respectively.



Methods of propagating: If the new shoot is cut off at A, leaving a stump of shoot, it can be rooted easily and more shoots will grow from the stump to provide further cuttings later. If only one cutting is required, it can be cut off at B with a heel of tuber attached; taken thus the cutting will root rather more easily than if cut at A. Alternatively the whole tuber can be severed from the crown at C and planted out complete or potted up. If put into a pot, the tuber will probably have to be reduced in size by cutting it off at D.

Planting out

Before planting is done it is best to plan the area to be planted to give the best arrangement for flowering, namely the taller varieties at the back and the colours grouped together. The area can then be staked to give the planting positions. The holes to accommodate the plants should be larger than the rooting systems, whether the plants are rooted cuttings, divided tubers, or clumps. The soil should be firmed around the plant. For the taller varieties requiring staking it is best to put the stakes in before the tubers are set so that there will be no damage. After the area is planted it should be given a good soaking, preferably with a fine rosed hose.

Cultivation

Cultivation consists of hoeing to keep down weeds and also to keep the soil loose to reduce loss of moisture. Care must be taken not to hoe too deeply or the tubers may be damaged.

Staking and Tying

If the position is at all exposed, staking is necessary to support the plants, especially the taller growing varieties. A good sturdy stake is required and if this is placed near the centre of the plant, the tying can be done so that the stake is hidden. The stake should be driven into the ground so that its top will be about 6in. below the maximum height of the fully grown plant. Tying can be done with raffia or some other suitable material, but care must be taken to ensure that stems are not tied too tightly to the stakes or the binding may cut into the stems as they grow. Labels may be placed on long stakes so that they show above the growth, if desired, but it is usually preferable to tie them on the supporting stake lower down, tie them loosely on the stem, or insert them in the ground at the base of the plant.

Thinning and Disbudding

Thinning of the stems is not necessary, except where the grower wishes to produce show blooms. Disbudding, however, can be done to give a stronger main bud. As dahlia stems are rather tough and do not break easily and cleanly, this operation is best carried out with the use of a sharp knife or secateurs. Old flower heads should be removed as soon as they begin to fade to maintain the vigour of the plant and keep it tidy.

Watering

During periods of dry weather watering may be necessary. Regular hosing can be carried out and a good drenching every 3 or 4 days is preferable to a daily watering, as the latter system tends to produce too much soft growth. Mulching the ground will help to retain the moisture in the soil. Liquid manuring can also be carried out if the plants require further feeding during the growing season. This is best carried out after watering.

Post-flowering Care

As with all plants that have perennating organs the longer growth is maintained the greater will be the amount of food stored for the next season. Therefore dahlias should be allowed to grow for as long as possible and it is usual to leave them until the first frosts occur. When foliage has died it should be cut off to within about 4in. of ground level. This material if disease free can be placed on the compost heap. However, should it be suspected of having any virus or fungus disease that will carry over, it should be burnt.

In order that named varieties will not be lost labels should be tied to the stems of each clump of tubers. Wooden or plastic labels are best and should be tied on with string or wire.

Lifting and Storing

Lifting is best done with a spade and the soil should be shaken off the clump. Careful handling will ensure that there are not too many tubers knocked off the clump during this process.

The clumps can then be stored in a cool, dry shed where there is adequate ventilation. Any parts showing damage or rots should be cut out and the cut dusted with flowers of sulphur. If a suitable shed is not available, the clumps can be successfully stored out of doors. A mixture of beach sand and sawdust can be used, with a larger proportion of the sand. This can be mixed and a layer about 3in. deep laid on the soil surface. The clumps should be placed together in rows and covered with the sand-sawdust mixture to form mounds. The labels used in the border can be used to identify the groups in the mounds. For this overwinter storing the driest spot in the garden should be used. After winter a close watch should be kept on these stored dahlias to see that they do not break into growth too soon, because of the possibility of damage by late frosts.

Diseases and Pests

Although dahlias are strong growing and have fewer diseases than many other types of plants, the diseases which do affect them can cause a great amount of trouble to the gardener. The best disease preventive is to start with disease free stock at all times.

Virus diseases are the most serious and there are a number which attack dahlias. Symptoms vary from a stunting effect to a mosaic effect on the leaves. Virus diseases can be transmitted by aphides and thrips, and in some cases by knife blades or on the hands, so it is necessary that in a group the diseased plants should be handled last.

Although virus diseases cannot be cured by sprays, dipping, or any other known treatments, the spread of these diseases can be controlled somewhat by the following methods:—

1. Destroy completely by burning all obviously infected plants as soon as they are observed.
2. Purchase only virus free plants.
3. Use for propagation only those plants which show no symptoms of infection.
4. Control aphides and thrips by spraying with nicotine sulphate 40 per cent. 1 in 600 or 4/5 fl. oz. to 4 gallons of water plus a spreader, which is effective only when temperatures are high and the weather calm, **or** H.E.T.P. 1 in 1200 or 2/5 fl. oz. to 4 gallons plus spreader, which is effective at lower temperatures than nicotine sulphate.

Note: The directions on the container should be followed and all prescribed precautions taken when these materials are used.

Dahlia Wilt

Dahlia wilt (*Verticillium dahliae*) has a wide host range including stone fruits, berry fruits, solanaceous plants, and garden plants. It causes wilting and the leaves of badly affected plants hang as if suffering from drought. The only method of control is to remove the affected plants and burn them.

Dahlia Smut

Dahlia smut (*Entyloma dahliae*) is a fungus which first shows as light yellow-green spots on the leaves, which later turn greyish brown, the edges becoming dark brown. The dead tissue soon becomes brittle and falls out, giving a shot-hole effect. The fungus overwinters on dead leaves or stumps. Early planting helps as a control and Bordeaux 3 : 4 : 50 should be applied when the disease first appears. All dead leaves should be burnt.

Stem Rot

Stem rot (*Sclerotinia sclerotiorum*) causes rotting of the stems. Sunken water-soaked regions appear at ground level on the stem, which soon collapses. Under moist, shady conditions the stem may become completely encircled with a white fluffy mycelium and black sclerotia develop inside the stem. Control measures consist of having good drainage and not having the plants overcrowded. Diseased plants should have infected parts cut out and destroyed.

Leaf Miner

Leaf miner tunnels in the leaves. A 2 per cent. D.D.T. spray applied early in the season or 1 : 600 nicotine sulphate at weekly intervals would most likely control the egg-laying adult.

Looper Caterpillar

Looper caterpillar, which is common in spring, grows to about 1¼in. long. It is light green, almost hairless, with white and darker green stripes on the back. The caterpillars eat from the lower surfaces of the leaves, leaving only a thin skin of upper epidermis, which ultimately dies and falls out, leaving holes. When moving the caterpillars arch their bodies and proceed in a series of loops. They can be controlled by spraying with a mixture of 2lb. of arsenate of lead powder to 100 gallons of water. Dusting with D.D.T. or derris is also effective.

Earwigs

Earwigs can be troublesome and are controlled either by trapping them or by spraying them with D.D.T.

Garden Work for November

With the approach of warmer weather renewed interest will be taken in flower garden activities and plans will no doubt be formulated for a more successful year than ever before. As in all gardening work the gardener must look ahead, and with most of the seed sowing for the raising of annual bedding plants now finished, the work of prime importance during November will be sowing seeds of biennial and perennial plants for continued displays in the future.

If this year's spring display of wallflowers, sweet william, forget-me-nots, and the like are not yet removed they should be taken out immediately to make way for the planting of annuals for a summer and autumn display. Ground recently cleared should receive a dressing of well-rotted manure, or organic material during digging, before any summer bedding is done. Where this material is not available a fertiliser should be applied of 3 parts of blood and bone, 2 parts of superphosphate, and 1 part of muriate or sulphate of potash at 3oz. to the square yard.

[*Campbell*

Left—When they are stored outside tubers are arranged in rows on a sand-sawdust base and then covered over. Right—Dahlias stored outside in mounds of sawdust and sand. Each group is labelled, the labels from the border being used.

If the soil is dry, it should be watered thoroughly the day before setting out the plants. Care should be taken to see that the consolidation of the soil is not excessive during planting; a length of board as a walk can be used. The necessary hardening off of boxed plants and the setting out of such plants as petunias, zinnias, salvias, asters, marigolds, stocks, and phlox should now be carried out without delay.

For late summer flowering planting should be continued as space and plants become available of such reliable subjects as calendulas, hybrid wallflowers, paris or tree daisies, hardy calceolarias, gaillardias, dianthus, coreopsis, and *Salvia horminum* (Clary).

Sowings Now for Future Display

Sowing should be continued of hardy annuals in places where they are to grow and flower, but they should be sown thinly, and later thinned out for best results. There are a few varieties of annuals, however, which are grown for border edgings or mass effect and these may be left unthinned; for example, virginia stock, evening-scented stock, and linum.

Biennials

Biennials commonly grown include wallflowers, Canterbury bells, sweet william, myosotis, *Bellis perennis* (double daisies), East Lothian and Brompton stocks, and lunaria (honesty). Botanically many of these plants are not strictly biennials (some are perennials), but because they can be readily raised from seed and give their best display in the first flowering season, the usual gardening practice is to treat them as biennials. Biennials are plants which develop into strong young plants the first season, winter well, and then grow on to maturity and flower during the next spring and early summer. After the first season's flowering they are better discarded. Many gardeners retain such plants as wallflowers for a number of years, but they become very woody and although they bloom each spring, the display is not comparable with that made in their first season.

Success lies in sowing seeds of biennials early; November is an opportune time. The seed may be sown in the ground in frames or outdoors in soil moderately rich and broken up to a fine tilth before the drills are prepared. Sowing in boxes as carried out when raising annual plants can also be done and is particularly advisable where there is likely to be trouble from pests, weather, or weeds.

Perennials

In addition many perennial plants may be raised from seed sown in November. Some of these which are easily raised from seed are *Lupinus polyphyllus*, *Coreopsis grandiflora*, *Chrysanthemum leucanthemum*, aquilegia, delphinium, hollyhock, anchusa, mecanopsis, statice, gaillardia, and geums.

The seed should be sown in pots or boxes of sterilised soil, comprising two parts of turfy loam, one part of leaf-mould, and one part of clean sharp sand, and then placed in a glasshouse, without artificial heat, in a garden frame, or on a veranda. Where such facilities are not available sowing in the open ground could be done if great care is taken and a watch is kept on possible losses through weed and pest invasion, or extremes of moisture or dryness. If a good watering is given to the boxes several hours before sowing, further watering should be unnecessary until after germination has taken place.

In all cases it is most important to raise perennials from a good strain of seed which should be as fresh as possible. As some seeds are often slow in germinating, it may be necessary to leave the boxes or bed undisturbed for as long as 6 weeks in some cases before the young seedlings appear.

Rockery Plants

Seeds from plants in the rockery may be saved as soon as ripe and may be planted immediately where new plants are required. They should be sown in pots or pans of gritty soil and left either uncovered or covered with the finest possible layer of sand. Among the rock plants which may be raised from seed sown in November are aubrietia, *Silene compactus*, campanula (various), alyssum, arabis, cheiranthus, cerastium, and primula.

Glasshouse or Border Display

For a bright display in the glasshouse during next winter a small early sowing of the following seeds may be made toward the end of November, where early plants are desired: Cineraria, *Primula obconica*, *P. kewensis*, and *P. malacoides*.

Small seeds need very little covering of soil. A light dusting of finely sifted soil is said to give more even germination than no covering or a heavy one. Water the soil several hours before sowing and further watering, if necessary, should be done only by standing the container in a dish of water, which allows a gradual intake from below. Finally it is advisable to place the container in a warm, shady corner and cover it with a piece of glass and paper to prevent any drying out before germination. Germination of primulas is generally irregular and it may take from 3 to 6 weeks. As soon as the seedlings can be handled safely they should be pricked off 2in. apart each way into boxes.

Gladioli

Earlier plantings of gladioli will now be growing strongly and if staking has not already been done, this work should be carried out as soon as possible. Insert each stake 2 to 3in. behind the plants and tie each spike loosely as growth progresses. Support is necessary to keep the flower spikes straight as well as to avoid damage by excessive wind or rain.

Chrysanthemums

Chrysanthemums not yet in their permanent quarters should be planted without delay. A strong, stout stake should be provided for each plant and care should be taken to be sure the plant is securely but not tightly anchored to it from the outset. Stopping, or pinching back, excess top growth of any one-stemmed plants to encourage branching may be necessary at this stage of their growth if no natural break has occurred.

Dahlias

Dahlia planting should soon be completed. In colder districts where early planting is unwise this work should be pushed on, and in the milder districts a succession of flowering is possible by a further planting at present, if young plants are available.

Earlier plantings will now be growing strongly and where young plants have not been used, it may be found that excessive growth is coming away from old tubers. Thinning of shoots in such cases would be wise and it is best to remove these by gently pulling them away from the tubers with the fingers, as cutting them may only serve to encourage further growth from lower buds that remain. Early staking is necessary and if possible the supporting stakes should be a little smaller than the ultimate height of the plants. The ties should be reasonably loose around the plants, but fixed firmly to the stakes to avoid them slipping downward.

Bulbs and Perennials

Early flowering subjects such as hyacinths, narcissi, and tulips may now be lifted carefully if their place is needed for summer bedding. They should, however, be removed and replanted in an odd corner of the garden where they may die down naturally.

Spring perennials like polyanthus, primroses, and aubrietia can also be lifted to make way for the summer flowers. These plants may be divided up where necessary and set out in a reserved part of the garden to grow on during the summer.

Pruning Flowering Shrubs

Pruning of those shrubs which flower in early summer after some growth has been made should be done after they have flowered. The old flowering shoots and weak wood should be thinned out, and the young growth allowed to develop and ripen; for example, on philadelphus, deutzia, and diervilla (Weigela).

Remove dead blooms of rhododendron and azaleas as soon as they are noticed to prevent seed pods forming.

Mulching

Mulching of camellias, rhododendrons, azaleas, and ericaceous plants during November with well-rotted compost, spent hops, sawdust, or leaf-mould helps to conserve moisture and maintain the soil conditions which these subjects seem to prefer. It is necessary, however, to see that the soil around the plants is in a moist state before the materials are applied.

Hedges

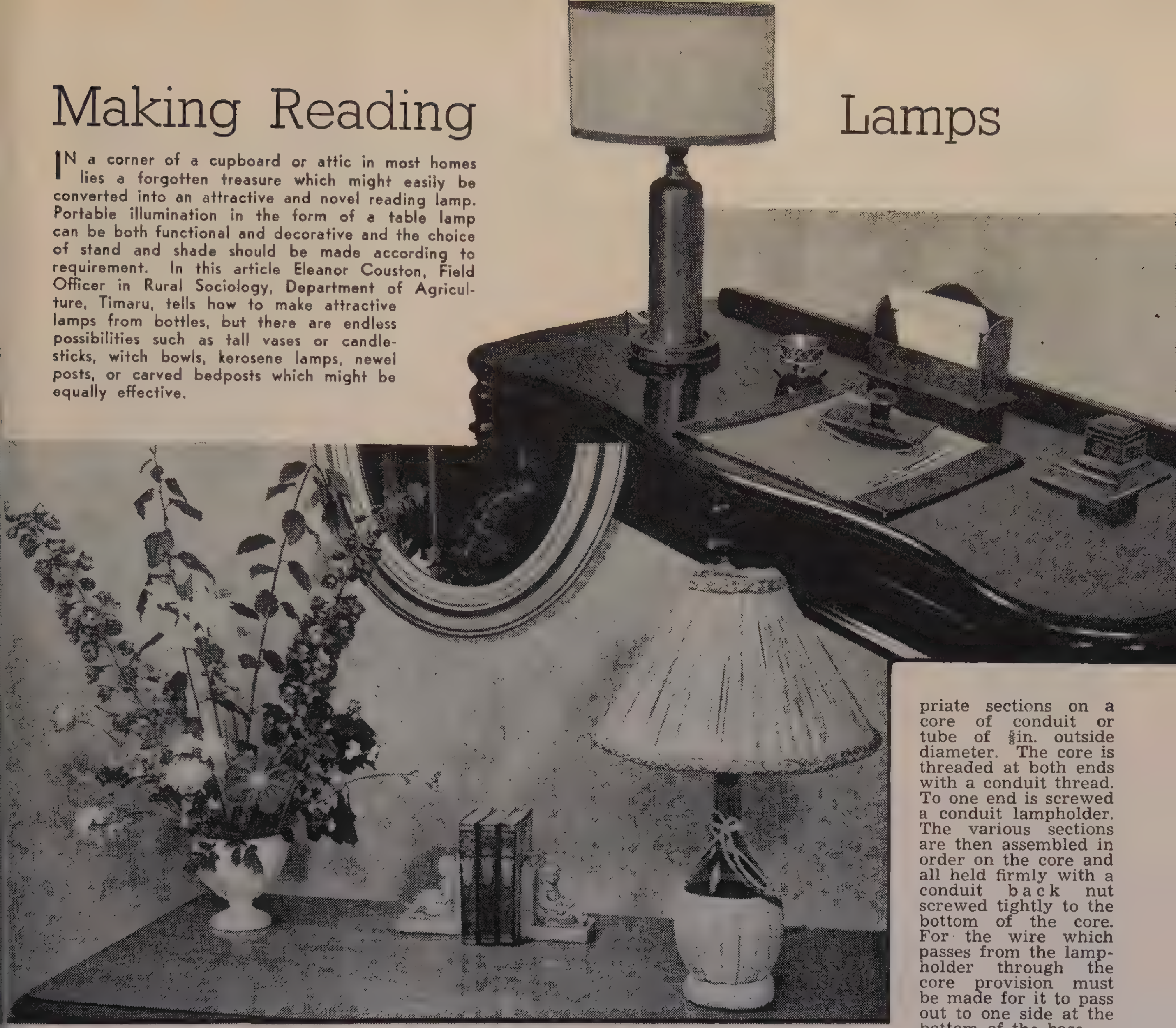
Hedges should be given their first clip of the season as soon as early growth makes them untidy. The soft clippings, if healthy, will make a valuable addition to the compost heap.

Roses

To conserve the vitality of roses suckers or basal growths must be removed as soon as they are seen. Discriminating disbudding must be practised if large well-formed blooms are wanted. They should be sprayed in advance for possible mildew or aphis infection.

Making Reading Lamps

IN a corner of a cupboard or attic in most homes lies a forgotten treasure which might easily be converted into an attractive and novel reading lamp. Portable illumination in the form of a table lamp can be both functional and decorative and the choice of stand and shade should be made according to requirement. In this article Eleanor Couston, Field Officer in Rural Sociology, Department of Agriculture, Timaru, tells how to make attractive lamps from bottles, but there are endless possibilities such as tall vases or candlesticks, witch bowls, kerosene lamps, newel posts, or carved bedposts which might be equally effective.



HEADING PHOTOGRAPHS: Tubular lamp with parchment shade for a man's desk and Italian wine bottle with raffia shade.

THE selection of a lampstand should be made according to the character of the room and the position the lamp is to occupy. The lamps illustrated would be incongruous in a drawing room, but the plain, tubular shape with tailored shade would look well on a desk in a man's den, the raffia bottle and shade in a cottage or timbered room, and the pottery jar of wedgwood blue with pleated shade suggests a dainty bedroom.

The purpose of the lamp will determine the height of the column and the choice of shade. The recommended over-all height for table lamps is between 20 and 30in.; a bedroom lamp may be only 12in. high. The shape and size of the shade will be influenced by the proportions of the stand. To find the most pleasing proportions an outline of the column can be made on paper and various sizes and shapes of shades laid above it. The shade should be deep enough to conceal the bulb and wide enough to give adequate spread of light.

A firm base is essential and a bottle can be weighted with shot or sand or fitted with a base of wood or metal. To protect the surface on which the lamp stands a piece of felt should be gummed to the base.

Electrical Fittings

Electrical fittings may be purchased complete with lampholder, switch, and flex and with corks of various sizes which can be pared down to fit various sizes of bottle necks. When possible it is better to carry the flex through the bottle and through an outlet at the base, as then there is less likelihood of tipping the lamp by accidentally catching the cord. This necessitates having a hole large enough to take the flex bored by a glazier. If the lamp base requires weighting with shot or sand, the flex will have to come from the top.

When the facilities are available and the lamp is to be fitted with a base a good method is to assemble the appropriate sections on a core of conduit or tube of ⅝in. outside diameter. The core is threaded at both ends with a conduit thread. To one end is screwed a conduit lampholder. The various sections are then assembled in order on the core and all held firmly with a conduit back nut screwed tightly to the bottom of the core. For the wire which passes from the lampholder through the core provision must be made for it to pass out to one side at the bottom of the base.

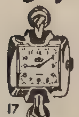
All wiring must be done by a registered wireman.

Foundation Frames

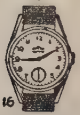
As wire frames are difficult to obtain, the simplest method is to use the wire foundation from an old lampshade. If none is available, specifications can be given to a wire worker who will construct the frame. If the amateur is adept with a welding torch or soldering iron, a frame can be made at home. Different thicknesses of wire are used according to the size of the shade, but the wire should always be thick enough to give rigid support to the covering material. When a stiff material such as parchment is to be used no side supports will be necessary, but for fabric or raffia shades four uprights

SWISS WATCHES

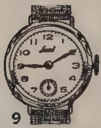
5 years Service FREE!


17

Covering cleaning mainspring overhaul, glass and hands replaced FREE once in every 18 months. BETTER WATCHES — BETTER PRICED — BETTER AFTER SALE SERVICE (Periods of guarantee shown).

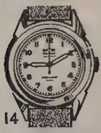

16

17 Ladies' "BUTEX" — 17 jewel, 20 microns gold case and bracelet, shock and dust proof Oval glass (5 years' guarantee) £13/5/- £18/5/- £22/10/-


9

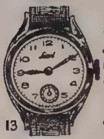
16 Ladies' "BUTEX" — 15 jewel lever, stainless, ribbon or leather strap (5 years' guarantee) £8/18/6 (with bracelet £10/2/6).

9 Ladies' "LANCYL" — plain dial, chrome case (6 months' guarantee) £4/15/-


14

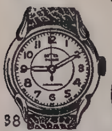
14 Gents' "BUTEX"—15 jewel, dust and jar proof, unbreakable glass, luminous £10/17/6 Special waterproof (5 years' guarantee) £13/2/6

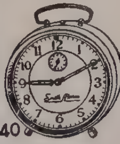
13 Gents' "LANCYL" — luminous dial (6 months' guarantee) £4/15/-


13

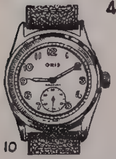
18 Gents' "BUTEX"—17 jewel, dust and jarproof, sweep second hand, luminous, unbreakable glass 20 microns gold (5 years' guarantee) £16/5/-

10 Gents' "ORIS"—luminous, unbreakable glass, stainless strap (12 months' guarantee) £5/16/-


38

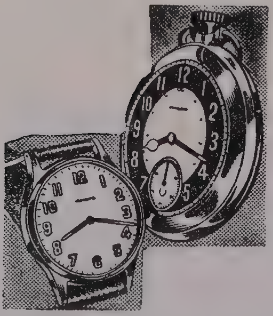

40

40 SMITH'S Alarm Clock. Green, Ivory or Blue. Luminous dials (6 months' guarantee). as shown 29/3. with base stand 32/6.


10

3-DAY WATCH & CLOCK

MAIL REPAIRS



Quotations given—unconditionally guaranteed. You are no further away from Jefferies' service than your nearest mail box.

MEN'S INGERSOLL TRIUMPH. 5 jewel Wrist Watch all in free service, luminous. Only 77/6

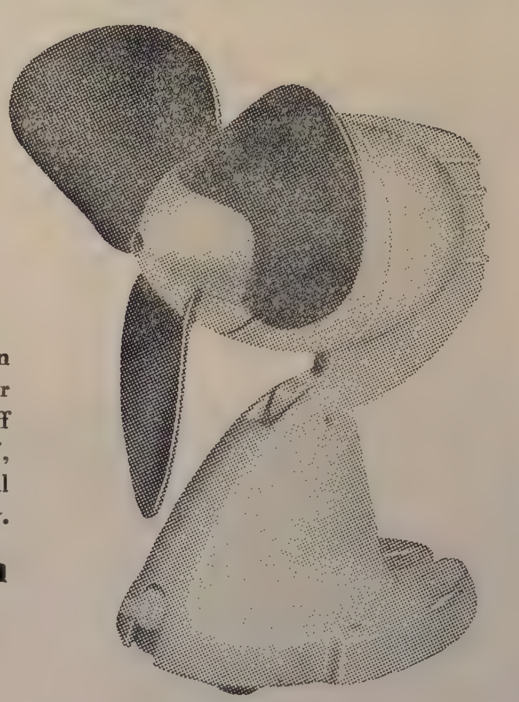
Above: TRIUMPH POCKET WATCH. Sturdy, reliable. (6 months' free service), luminous. 37/6

THE JEWELLERS

JEFFERIES

187 MANCHESTER STREET, CHRISTCHURCH
(Watch and Service Warehouse).
J 10. Established 1925.

Rubber blades for Safety



Modern streamline design electric fan. Black rubber blades, white plastic on/off switch. Fan diameter 8″, weight only $8\frac{1}{2}$ lbs. Full voltage range — A.C. only.

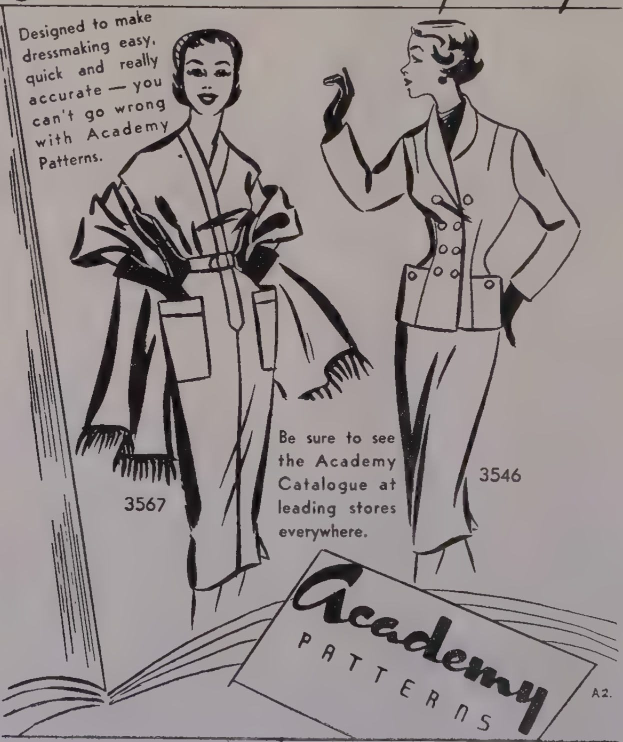
£4.3.6 each

G.E.C.

BRITISH GENERAL ELECTRIC CO. LTD.
Wellington • Auckland • Christchurch • Dunedin
or your nearest Electrical Dealer

EF.1.9

Sketches from the Academy Catalogue



Designed to make dressmaking easy, quick and really accurate — you can't go wrong with Academy Patterns.

3567

3546

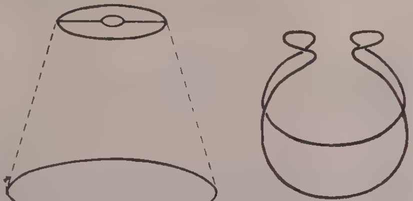
Be sure to see the Academy Catalogue at leading stores everywhere.

A2.

you can't go wrong with Academy

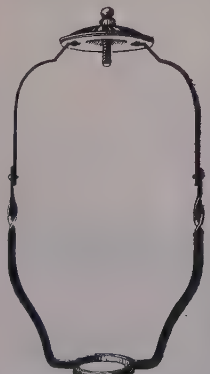
Various objects which might be transformed into reading lamps.

will hold the top and bottom wires in position. The upper wire is attached to a gimbal ring which will take the lampholder.



Gimbal ring (left) and butterfly (right) lampholders.

If the shade is deep enough to cover the socket when the lamp is assembled, a "harp" which gives good support to the frame can be used; otherwise the "butterfly" type of bulb holder is satisfactory. In a third type the upper ring is supported on a jointed harp, which allows the shade to be tipped to direct the light where required. This is known as a swivel gimbal.



Harp lampholder.

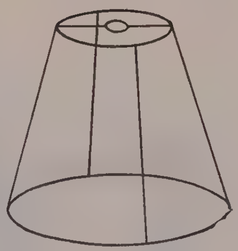
Before being covered, wire foundations should be painted with flat paint or enamel or bound with bias binding or raffia. With the harp or swivel gimbal type of support the gimbal ring is not covered, as this extra thickness may make it too tight to fit in the socket ring.

Lampshades

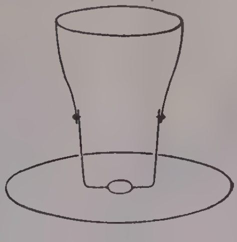
The choice of material for covering the shade will depend on the character of the stand and on the furnishing scheme of the room. Another important consideration is whether the material will diffuse or restrict light, and this is best determined by testing it over a naked light bulb.

Converted kerosene lamp with plastic shade.

A selection may be made from paper, including parchment, from plastic material designed specifically for the purpose, from fabrics, or from raffia or string.



Frame with supporting wires.



Swivel gimbal.

Colours should be tested to make sure they tone with room colourings both in daylight and in artificial light. Plain, simple lampshades are in better taste than fancy shades, and beads, frills, and fussy decorations are outdated. Simple edgings of braid, cording, velvet, raffia, or bookbinding will make a neat and effective finish.

Patterns for Shades

One of the most common types of shade is known as the empire shade and is conical with a flat top. To cut a pattern for this type of shade it is necessary to use accurate measurements and to follow instructions carefully. The following is the method:—

First draw a true, full-scale elevation (B) of the lampshade (A) at the foot

Edmonds
Finest
MAIZE
CORN FLOUR
1LB.
Edmonds
CORN FLOUR

Now in the **NEW** Pack **1/7½**

MAIN
CENTRES

Ask for **EDMONDS**

STOCKED BY ALL LEADING GROCERS

Serve Coffee with the *Real* Flavour!

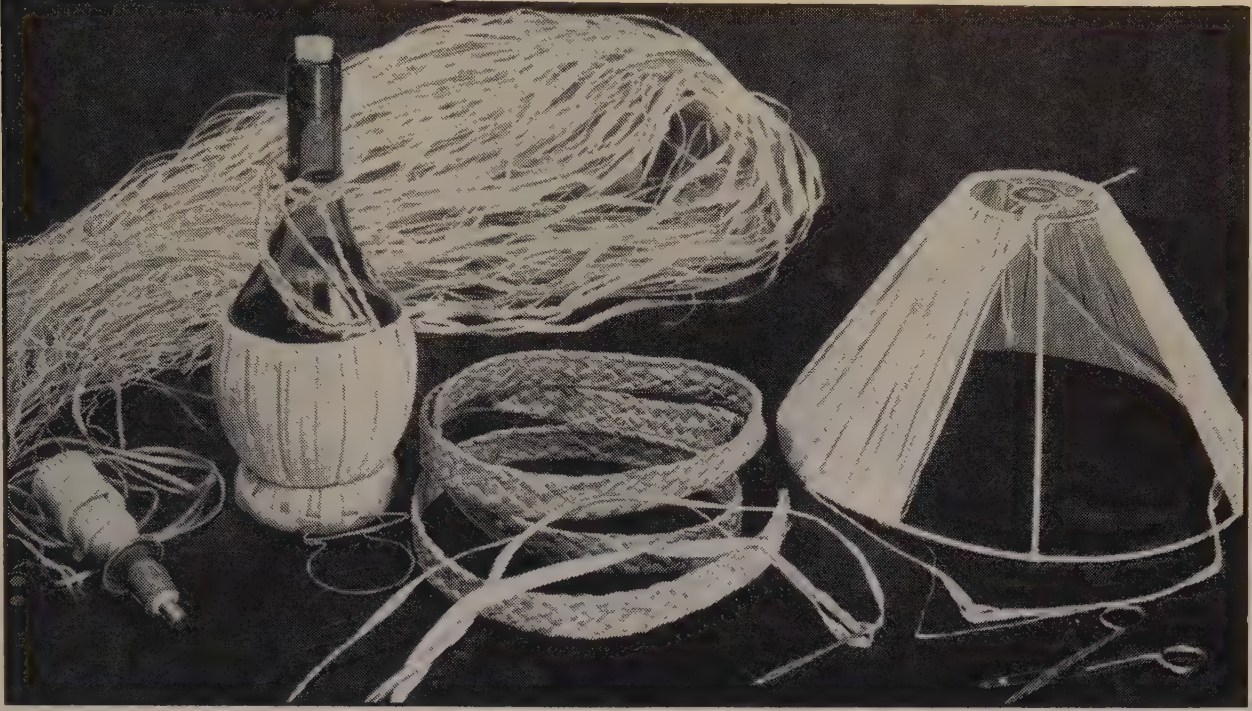
THE MAGNIFICENT SPEEDEE ELECTRIC COFFEE PERCOLATOR—in long-lasting Chromium, makes coffee as the Americans know it—Coffee with Zest and tang—with full flavour and no grains.

Only **£6/17/6** at leading electrical, departmental, and hardware stores.

Made by:
H. C. URLWIN LTD.,
WALTHAM, CHRISTCHURCH.

SPEEDEE ELECTRICAL APPLIANCES ARE DEFINITELY FASTER.

The "Speedee"
Electric Coffee Percolator



A raffia shade in the making.

of a large sheet of brown paper (see diagram below). The width at the top should be equal to the diameter of the top ring of the frame, and the bottom of the elevation drawn on the sheet of paper should be equal to the diameter of the wire ring fitted to the bottom of the lampshade. It is important to make an accurate drawing. As a guide to the height of the lampshade elevation add the diameters of the top and bottom rings of the frame and halve that total. For instance, if the diameter of the top ring is 6in. and that of the base ring is 10in., a total of 16in., the height of the lampshade should be 8in. This should be considered as a guide only, and lampshades can be made any height to suit the individual requirements of the craftworker.

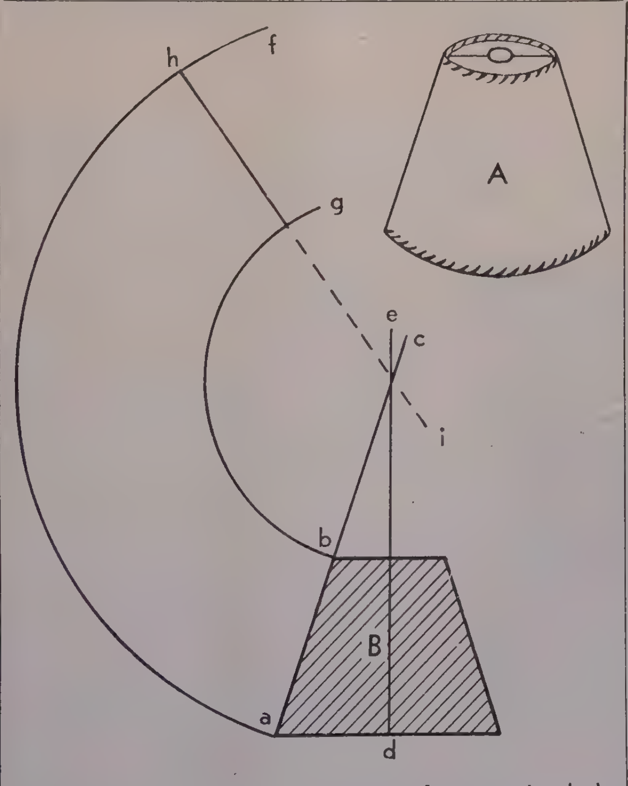


Diagram showing the cutting of a pattern for an empire shade.

After drawing the elevation of the lampshade draw a line extending the left side (ab) of the elevation to c. Draw a second line vertically through the elevation in the middle (line de). From the axis (where lines ac and de meet) draw an arc (af) from the bottom left corner of the elevation to the top of the paper. Draw another arc (bg) from the top left corner of the elevation to the top of the paper. To complete the pattern outline take the largest ring of the lampshade frame and roll it along the arc af. Mark the ring at the starting point and mark on the paper where the mark on the ring meets the line of the arc af (h on diagram). From h draw a line (hi) to the axis of ac and de and the pattern outline should be clearly marked.

The ends of the pattern will meet round the frame, and extra should be allowed where the ends of the material are required to overlap.

Straight-sided Shade

For straight-sided shades accurate measurements are again necessary, but the cutting of a pattern of this kind is simple. The diameters of the upper and lower circles are the same and the pattern consists of a rectangle, the base of which is equal to the circumference of the wire plus sufficient for overlap, and the side of the rectangle is equal to the required depth of the shade.

Pleated Shade

A pleated shade is also made from a rectangle of material, but the length of the material must be one and a half times the circumference of the lower edge of the frame. Parchment or buckram is suitable for pleating and pleats of ¾in. are made by marking and folding the material. Holes are punched through both sides of each pleat about 1in. from the top of the shade and about twice this distance from the lower edge. These holes should be made about ¼in. from the inner edge of each pleat. Cord is then run through the holes and the pleats are drawn up until they fit the frame. The shade is then attached to the frame by long stitches.

Pleated buckram shade surmounting a blue pottery base.

There are many other possibilities such as rectangular, fluted, pyramidal, or curved panel shades, the making of each of which requires a separate technique. It is best to start with the simpler types until some skill is acquired, when the more complicated patterns can be introduced.

Raffia Shade

For a raffia shade a frame with side supporting wires is necessary. Other materials required are a hank of raffia (plain or coloured), a length of sea-grass, and a sailmaker's needle. The raffia is dampened to give it greater flexibility and to enable the worker to pull it tautly over the frame. The frame is bound neatly with strands of raffia and then covered by winding the raffia over the two rings. The edges are then bound with dampened sea-grass, the sailmaker's needle threaded with raffia being used. Stripes of different shades of raffia may also be used or a simple design worked on the shade with coloured raffia.

Parchment Shade

A drum-shaped shade similar to that surmounting the tubular lampstand shown in the heading illustration on page 385 can be made by cutting parchment into a rectangle according to the directions given previously and joining the overlap with glue. The frame is attached to the shade with bookbinding, which is also glued into position. Alternative methods would be to attach the shade to the frame and finish the outside with a neat braid edging or to punch holes in the parchment and to thong the shade and frame together with cord or raffia. To give stability to the lamp illustrated a wooden base has been attached. This was made by turning a small piece of wood on a lathe and glueing it into position. It was then varnished to match the bottle, and a circular piece of felt was fixed to the bottom.

Fascinating Hobby

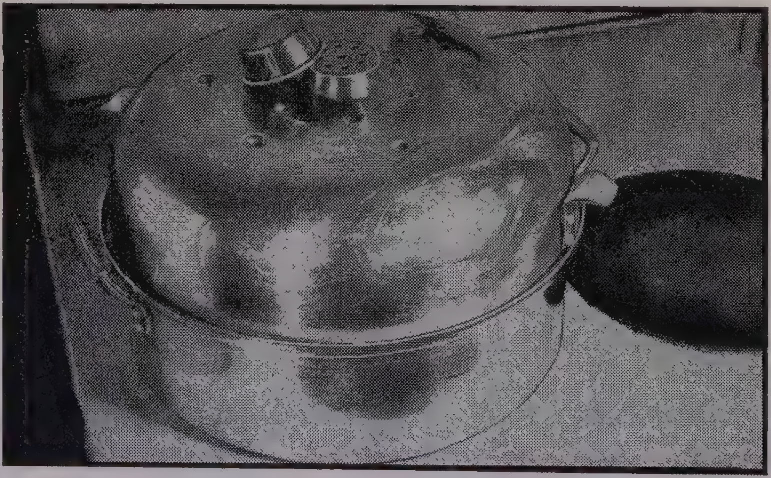
The making of lamps and shades can become a fascinating and useful hobby and the few ideas presented here might form a nucleus for the beginner. An attractive lamp will add charm to a room and express the individuality of the maker. Little technical skill is necessary, the important factors being the choice of suitable materials, the preservation of good balance, and the placement of the lamp for effective illumination.

Acknowledgment

The empire pattern is adapted from that given in "Lampshade Making", by F. J. Christopher, F.R.S.A., published by W. and G. Foyle Ltd., London.

All photographs by Oddies.

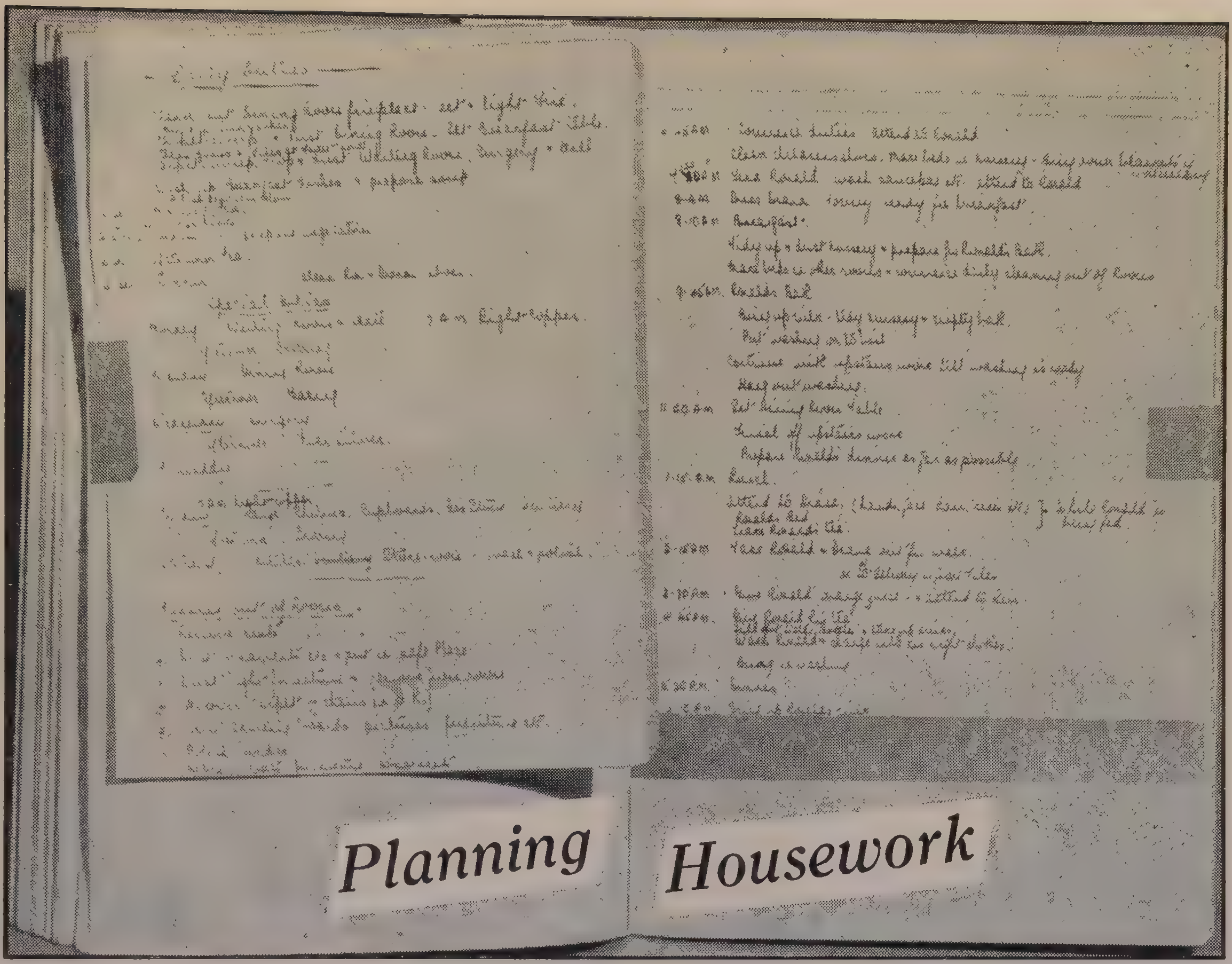
Pan for Roasting on Top of Stove or in Oven



[*Sparrow*

THE aluminium roasting pan illustrated can be used either in the oven or on top of the stove. It is 12in. across and 7½in. deep. To use the pan first brown the roast on both sides in hot fat in the lower half; then cover the pan with the lid, leaving the cap for the vent off. The steam will push out all the air in the pan. When the steam is flowing freely from the vent cover the vent with the cap and allow the meat to cook, turning it when necessary. Half an hour before the roasting is finished remove the vent cap to allow the steam to escape and the meat to crisp before carving. The pan and the lid both have handles for lifting.

—*MOLLY MACPHERSON,*
Field Officer in Rural Sociology,
Department of Agriculture,
Auckland



Planning Housework

By MAUD B. STRAIN, Field Officer in Rural Sociology, Department of Agriculture, Dunedin

AS with any other major undertaking, a plan of campaign is necessary for running a house. If everything is done at the whim of the moment, a time will come when the accumulation of all the things that have been put off until a more convenient time forms such a devastating whole that the housewife learns by experience that the only sensible way is to work to some kind of plan.

HOME-MAKERS form the largest occupation group in the population. In New Zealand there are more than 100,000 rural homes alone, each of which occupies the greater part of the working time of at least one adult. Success in home-making, as in any other occupation, depends largely on the manner in which time given to it is used. The aim of all home-makers is to achieve a well-cared-for home and satisfying family life and to accomplish this in such a way as to give them the greatest amount of personal satisfaction.

The home-maker has many advantages over almost all other workers. She has an elastic working schedule which can be re-arranged easily to meet emergencies, personal convenience, or preference; great variety in her work, and a paramount interest in the results of her work. However, the work is largely indoors, may entail some heavy physical exertion, and is ever-present; even in times of ill health the responsibility for keeping the home in running order cannot always be transferred. Constant interruptions, emergencies, and the infinite number of small jobs, trivial in themselves but usually all needing to be done at the same time, take their toll in nervous tension.

To run a home properly is a highly skilled art and it does not necessarily follow that because one is a woman one is therefore a good housewife. It is a job that must be learnt like any other. Some women have a greater natural aptitude than others in this direction, but anyone of average intelligence and with the will to learn can achieve some degree of success at this most absorbing and rewarding of occupations.

Modern conditions of life make it necessary for all people to use their time wisely, expeditiously, and economically, because much must be accomplished in each 24 hours. Planning the amount of time to be given to the various tasks helps to save physical and mental energy and allows more opportunity for outdoor activities, hobbies, and interests outside the home. Timetables are valuable in preventing overlapping when two people are doing the work and in ensuring that each part of the house is systematically cared for and cleaned.

Most housewives work to some kind of plan even though they may never have sat down to draw up a definite schedule. They have evolved, possibly unconsciously over the years, a system for getting through their housework with the greatest speed and least effort.

Fatigue

The avoidance of fatigue, that state when the power or desire to work is diminished, must be one of the objects of careful planning. Fatigue may be due to a variety of reasons, such as too long hours of work, muscle strain from standing, lifting, etc., nerve strain from interruptions, emergencies, or too many things to do at the same time, bad lighting and ventilation, and unsuitable clothing.

Fatigue breaks the smooth rhythmical movements of the worker,

HEADING PHOTOGRAPH: This work plan guided the activities in a busy household 18 to 20 years ago. Campbell photograph.

[*National Publicity*

The morning and afternoon cup of tea has at least one point in its favour: it provides an opportunity for relaxation.

increases the tendency to worry, and is often the cause of friction between family members. Dislike for a particular task may induce fatigue, whereas the task that is enjoyed seldom seems hard or tiring. The worker who continues to work when already fatigued produces less-effective work and at greater cost in nerve strain.

Skill

Skill helps a worker to avoid excessive fatigue by eliminating unnecessary movements. The skilled worker does the greatest amount of work with the smallest amount of effort. Skill is acquired in stages; in meal preparation, for example, the beginner starts with learning to make some simple individual items, scones, biscuits, etc., in this way discovering how to set about the work of cooking. The next stage consists of combining several individual items to make a meal and gradually to manage so that all the items are ready at the time the meal is required. As time goes on she thinks not only in terms of single meals, but in terms of the meals for each day or even a longer period. In this way are developed the skills in each type of work and the managerial skill of planning and co-ordinating the various activities known as home-making.

Household Standards

The amount of time and energy spent on the various tasks is influenced by household standards. Many are traditional—handed down from a previous generation when life was not so hurried and there were more to do the work. Reasonable standards for any family are those which can be maintained without undue effort and emotional fatigue, based on the well-being of the family members, rather than on what used to be done a generation or two ago.

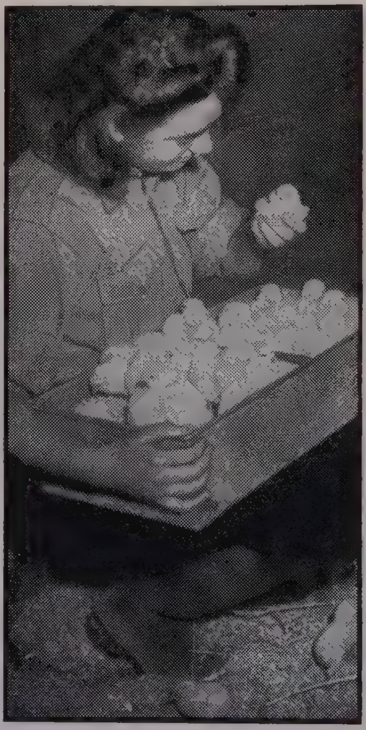
Standards may have to be lowered when children are small and none is able to help. They can always be raised again, if necessary, when more time becomes available with the growing up of the family.

Labour-saving Factors

Careful planning of the work centres of the home—for example, a well-planned, convenient kitchen and provision at the back entrance for workers to leave their farm clothes, boots, etc.—will save unnecessary steps and unnecessary floor cleaning.

The avoidance of clutter will save much effort. By this is meant the hoarding of possessions which will probably never be of further use but which require time spent in caring for them.

Convenient working heights for benches, sink, and wash tubs will conserve energy, as will a good knowledge of the quickest methods of work learnt either by personal experience or from others.



[*National Publicity*

Some farm women spend part of their time adding to the family income.

The correct use of tools, kept in good working order, increases efficiency. The housewife should try to do at one time all the work requiring the same tools and the same movements, thus saving time wasted in picking up and putting down tools and in changing the rhythm of muscular actions.

Work Planning

Without doubt the whole fabric of home life depends on the home-maker, and her managerial ability is more important than any other factor. It is equally true that careful work scheduling is the most effective way of saving time. Arising from the working out of a plan comes the thinking out beforehand of the method of carrying out the day's work. Thus not only is the day's work planned but how it is to be done.

No one plan can be put forward, as houses differ and a plan has to be made to fit the individual needs of each household. It may vary from week to week and certainly varies from year to year as children grow up and other circumstances change, but some plan which takes in all the work that has to be accomplished will prevent any items from being overlooked.

Drawing up a Plan

All routine tasks should be listed and put in separate categories according to how often they need to be done—daily, weekly, monthly, or seasonally. For example:—

Daily: Tidying up, mopping floors, dusting furniture, making beds.
Weekly: Washing, ironing, mending, turning out rooms, baking, cleaning silver.

Monthly: Cleaning windows, thorough cleaning of one of more rooms.

Seasonal: Fruit bottling and jam making, catering for seasonal workers.

The next step is to make a plan setting out the definite times for tasks for each day, such as meal times and the times necessary for the preparation and clearing away of meals. This is the skeleton plan for each day.

The third step is fitting other tasks that must be done each day into the skeleton plan at the most suitable time; periods in the morning and afternoon should be left for weekly, special, and seasonal tasks, some of which could be done each day.

The fourth step is to fill in the periods just mentioned by allotting to them their particular weekly, special, or seasonal task. If houses are kept clean on a day-to-day and week-to-week basis, there should not be the need for special spring cleaning except in rooms where the chimney has to be cleaned or papering and painting are necessary.

Thus the written schedule, made out for a week, will include:—

1. Everyday tasks: Meals, cleaning, care of children, outdoor work.

2. Weekly tasks: Washing, mending, cleaning, baking, shopping.

3. Personal requirements, rest, recreation, social activities.

4. Non-routine tasks fitted in where time is available.

Above—In the country much of the farm home-maker's spare time is devoted to beautifying the home surroundings. Right—Time is also given to producing the vegetables needed for the family throughout the year.

[*Photographs by Sparrow (upper) and Green and Hahn (lower)*]

This type of plan is simple to make and easy to follow. It should not be adhered to at all costs, but should be regarded as a guide listing what needs doing during the week and suggesting a suitable time for doing it. If a particular task is not done one day, it can be done the next, or if it is omitted one week, extra attention can be given to it the next week. When the various duties are listed and a time is allotted for each the housewife working systematically is less likely to omit duties or have an accumulation of them.

In emergencies—illness or outside work may occupy the major part of a day—all but essential tasks can be omitted from the day's plan; some may be postponed, or, if this is not acceptable, a little extra speed, an hour extra in the evening, or even a little more help from the family may be the means of catching up. Emergencies will arise, but a feeling of confidence in her ability to cope with the unexpected helps the housewife to meet them without being unduly worried.

Suggestions

For any but the experienced housewife a plan has to be worked out by trial and error. The original plan may be altered many times before a workable one is evolved. Before the day's work is begun it is worth while to plan mentally the sequence of the tasks to be done. Before doing each task think how it is to be done; much time and many unnecessary steps can be saved this way.

If two people are doing the work, tasks that require the same equipment must not coincide or overlap, and to plan work satisfactorily it is necessary to know how much time and effort are needed for various tasks.

Annoying delays can be avoided if equipment is kept in good running order, and any adjustments or repairs should be made before the tool is put away. Vacuum cleaners should be emptied, mops shaken, brooms freed from fluff and dust, and everything put away ready for immediate use later.

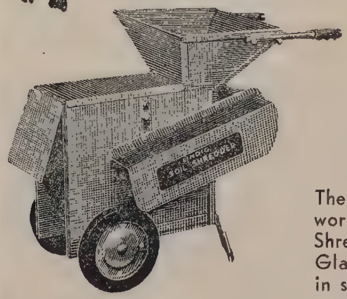
Housework plans should be so arranged that work is not being done under pressure and so that the work can be done by an efficient worker with her mind on the task in the time allotted to it.

With routine duties such as bed making, table setting, etc., the time occupied can be reduced to a minimum if the housewife takes the trouble to study what movements she makes in doing the task and seeing which ones can be shortened or eliminated. In dish washing, for example, if the dishes are scraped with a rubber scraper and piled together according to size at the left side of the sink, the minimum amount of space will be taken up and also the smallest number of movements will be necessary to carry out the process. A rhythm is established which speeds up the work. Bed

HOME GARDENERS!

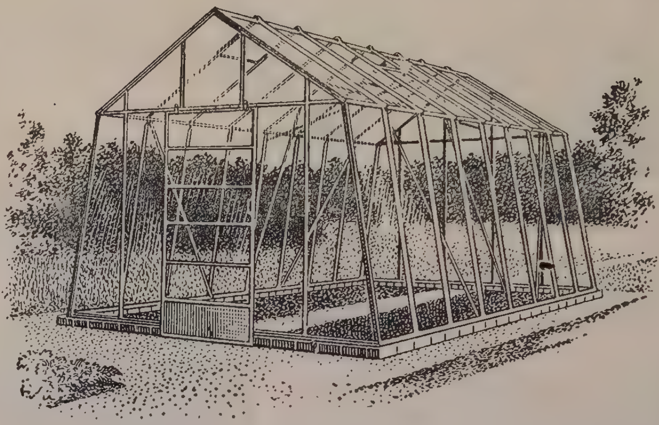
The Grower's Choice
is now Yours

LINDIG Soil Shredders and
Glasshouses by **BYRON**



The choice of growers the world over, LINDIG Power Shredders and BYRON Glasshouses are available in smaller models for home gardeners.

Write for full details and the name of your nearest agent.

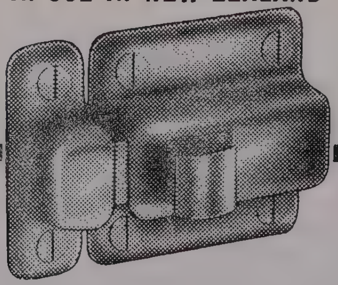


N.Z. Distributors:

IBL **Ivory Bros. Ltd.**

P.O. Box 1321 Wellington
Branches and Agents Throughout New Zealand

OVER
One Million
PALLO CUPBOARD CATCHES
IN USE IN NEW ZEALAND



If you want a cupboard catch that will stand up to wear and rough treatment and still maintain its good looks and efficiency, turn to **PALLO.** After years of continual improvement the **Pallo Cupboard Catch**, with its fine quality chromium finish, is as sturdy and reliable as continual cupboard use demands.

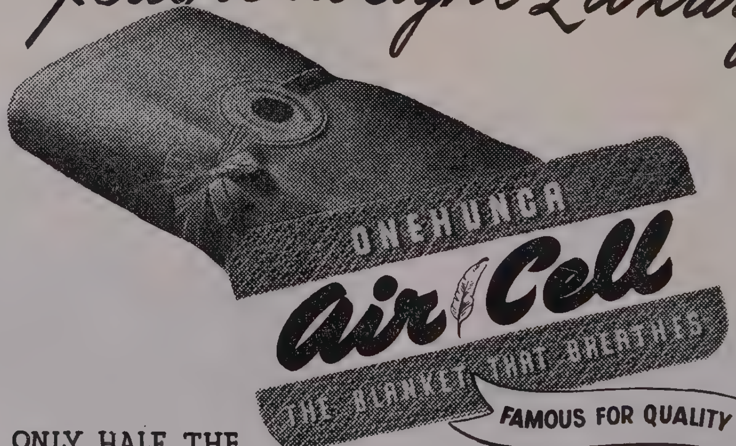
PALLO

Cupboard Catches

Are available from all Hardware Merchants and Builders' Suppliers.

Manufactured by Pallo Engineering Ltd.,
Wellington.

Featherweight Luxury



FAMOUS FOR QUALITY
THE WORLD OVER

ONLY HALF THE
WEIGHT — YET
TWICE THE WARMTH

SEAL OF QUALITY SARGOODS

A C 8-1

DISTRIBUTED THROUGHOUT N.Z. BY SARGOOD SON & EWEN LTD

making if done by two people is done in considerably less than half the time taken by each separately. A small tray used to carry the silver, cutlery, table napkins, etc., enables everything for each person to be collected and placed in the shortest time and with the least effort. Another point worth remembering is that concentration on the job in hand avoids mistakes, repetitions, and needless steps. The worker who makes her head save her feet accomplishes most in the least time.

A great saving of time is effected if tools and equipment are stored conveniently where they can be collected quickly, with all the materials needed for each task assembled together in a receptacle. Cardboard cartons, usually readily available from grocers, are admirable for this purpose. Into one can be placed everything necessary for floor polishing; in another the equipment necessary for cleaning the bathroom; another might hold window-cleaning materials or things needed for cleaning silver and brassware.

Recreational Periods

There is less danger of overwork and fatigue if work and recreational activities are spread over the whole week rather than allotted to certain days. The work plan should be arranged so that each day requires about the same expenditure of energy. Rest periods during the day are essential. The housewife in most cases works a 7-day week, as the family must be fed even on Sunday; though Sunday may be omitted from the work schedule, meals must still be prepared.

Because of the rest and relaxation it provides much can be said in favour of that New Zealand institution the morning and afternoon cup of tea, which whatever its detractors may say, provides a possibly short, but nevertheless valuable, mid-morning and mid-afternoon break.

Suggested steps in drawing up a schedule are:—

Step 1

Everyday Tasks

- Daily adjustment of plans
- Preparation and serving of meals
- Cutting lunches
- Dish washing and tidying up
- Straightening and cleaning
- Care of fires
- Rest and personal care
- Recreation and social activities
- Care of poultry, pets, etc.

Weekly and Special Tasks

- Washing and ironing
- Mending and darning
- Thorough cleaning of rooms
- Window and silver cleaning
- Shopping
- Baking
- Sewing
- Care of equipment

Seasonal Tasks

- Fruit bottling
- Jam and jelly making
- Blanket washing
- Gardening (flower and vegetable)
- Laundering curtains and loose covers

Step 2

7.30 a.m.: Breakfast
12.15 p.m.: Dinner
6 p.m.: Tea

A carefully planned household routine allows time for interests outside the home.

Step 3

6.30-7.30 a.m.: Prepare breakfast
7.30 a.m.: Breakfast
Clearing away, washing dishes, kitchen and bedroom work
Prepare dinner
12.15-12.45 p.m.: Dinner
Clearing away, washing up, kitchen work
1.45-2.15 p.m.: Rest period
5-6 p.m.: Prepare tea
6-6.30 p.m.: Tea
6.30 p.m.: Clearing away, washing up, kitchen work

Step 4

6.30-7.30 a.m.: Prepare breakfast
Care of fires, cut lunches, pack morning tea for men, feed fowls, first lot of clothes on to boil
7.30-7.50 a.m.: Breakfast
Clear away, wash dishes, kitchen work, start dinner preparation, daily cleaning and straightening of bedrooms, living rooms, back entrance, etc.
Weekly, special, and seasonal tasks
Monday:
Tuesday:
Wednesday:
Thursday:
Friday:
Saturday:
11.15 a.m.-12.15 p.m.: Prepare dinner
12.15-12.45 p.m.: Dinner
Clearing away, washing dishes, kitchen work, pack afternoon tea for men. (Dinner may have to be re-heated or even separate meal cooked for children arriving home from school)
1.45-2.15 p.m.: Rest period
2.15-5 p.m.: Weekly, special, seasonal tasks, and spare-time activities
Monday:
Tuesday:
Wednesday:
Thursday:
Friday:
Saturday:
5-6 p.m.: Prepare tea, feed fowls
Wood for lighting fires in morning, wood for fires, etc., some preparation toward breakfast
6-6.30 p.m.: Tea
6.30- — p.m.: Clear away, wash dishes, kitchen work, care of children, living room put in order before retiring, and (sometimes) breakfast table set for morning except for foodstuffs

Apart from setting down possible times for meals no attempt has been made to do more than indicate when other tasks could be done, because each household is different and each housewife must work out her individual scheme of work to suit her preferences, the type of farming, the season of the year, and the age of her family.

The special value of the schedule is that all the duties necessary for the efficient running of the household are listed and a time is set apart for them. If for some reason they cannot be done at the time set down, they can be done at some other time, but the point is, if they are written down, they will not be forgotten.

Further, if each day's duties are written down, time is not wasted wondering what to do next and one duty can be dovetailed with another so that while the housewife is working she is packing the utmost into the time. Thus time is being used economically, working time will be shorter, and there will be more time for recreation and those little extra things that make life more enjoyable; in other words, "a life as well as a living".

◆

Well-planned and Varied Menus are the Basis of a Healthful Diet

By EVELYN E. MOORE, Field Officer in Rural Sociology, Department of Agriculture, Palmerston North

SINCE scientific interest in nutrition was first aroused knowledge of the foods required to maintain a high standard of health in the population has steadily increased. Understanding of this subject is still growing, but it seems probable that there will now be little change in what is called the basic dietary pattern[*]. It has in fact changed very little during the last 20 years and its value has been thoroughly proved during that period by many controlled experiments. In New Zealand it is interpreted by the Department of Health and is available in a leaflet called "The Daily Dietary Pattern for New Zealanders"; the basic principles of this pattern have been mentioned in recent "Journal" articles.

THE dietary fads which gain publicity from time to time have often been found to be impracticable and even seriously to impair the health of some people who have perhaps followed them too literally. Most of these fads tend to die a natural death, but some of their conjectures still survive and usually these seem to have arisen from an imperfect knowledge or understanding of the digestive processes on the part of their originators.

Such statements as the following are common: Protein foods such as meat and eggs should not be eaten at the same meal as starchy foods—cereals, potatoes, and sugars, for example—and fruits and cereals or sweets should not be eaten together. There are many other so-called scientific rules about food combinations and other rules which forbid absolutely drinking with meals or eating between meals without regard to circumstances, and there are others which make a fetish of foods being eaten in their raw state and which declare that refined foods are extremely harmful to health.

These ideas are generally the result of the zealot's attitude toward food and have on the whole as little to recommend them as those of some who would go to the other extreme and refuse to listen to any advice about the beneficial effects food may have on health. Some of the diets advocated by people unrecognised by health authorities may also be deficient in energy value—a light breakfast for manual workers, for example, is especially so—and they may also have a low protein content compared with what is considered necessary today.

A consideration of some of these ideas will perhaps show how untenable they are in the light of modern knowledge of nutrition. One of the most far reaching, for example, when compared with present-day meal habits, forbids eating protein or acid foods, such as meat, eggs, and fruit, with cereals and other foods containing much starch or sugar, because it is said acid in fruits or secreted in the stomach inhibits the digestion of starches by the saliva.

[*National Publicity*

It is more important in meal planning to have a variety of simple nutritious foods, such as salads with wholemeal bread and butter and milk, than to worry about food combinations and rules about when food is or is not to be eaten.

In fact the secretion of digestive juices, containing acid- and protein-digesting enzymes[†], is a normal occurrence in the stomach the moment food is eaten, and it occurs whether the food contains protein or starch or both just as saliva is secreted and the mouth waters sometimes even before food is eaten. Acid secreted in the stomach aids the digestion of sugar, and fruits stimulate the secretion of a more alkaline saliva, therefore aiding starch digestion. In addition when food is thoroughly chewed and mixed with saliva the salivary digestion goes on for some time in the stomach before the stomach acids penetrate the food mass and finally stop the digestion of the starch in food. There is in any case adequate provision made in the small intestine for the digestion of carbohydrate-containing foods[‡] which escape digestion by the saliva, there being enzymes secreted for that purpose as well as for the digestion of fat- and protein-containing foods. This is therefore a process of digestion with which everyone in normal health can deal capably.

Similarly many other arguments for special food combinations or beliefs which forbid absolutely various meal habits such as drinking at mealtimes or eating between meals may be shown to be based on false premises or, though containing an element of truth in some cases, to be impracticable or unwise for everyone to follow. For example, though it is unwise for the overweight person to eat between meals, it has been clearly shown by several investigators that it is often of advantage to the health and working efficiency of the manual worker or underweight person to do so.

Moderate amounts of liquids taken at mealtimes may stimulate the flow of digestive juices, and if they help to make the meal a more pleasant function—an important aid to digestion—their use could be justified on these grounds alone.

Great emphasis is often placed on eating foods raw, because "that was the way Nature intended", but this argument obviously cannot be carried to its logical conclusion, and there is a wealth of evidence to show that under present-day conditions the cookery of many foods is a safeguard rather than a menace to health. Raw fruits and vegetables should always be included in a well-planned menu, and they are a very good source of vitamin C or ascorbic acid. The destruction of all other vitamins in the cookery of foods to conserve nutrients—pasteurisation of milk, for example, or in the cookery of porridge or boiled eggs—is negligible. Grated raw vegetable, often emphasised as a valuable food by faddists, does on the contrary lose considerable amounts of its vitamin C, because the cells of the plants are broken, setting free the enzymes which destroy the vitamin. Thus slicing vegetables with a sharp knife, which destroys far fewer cells, is a much more conservative way of preparing salads.

Finally as the weight of scientific evidence slowly increases against the advocates of this or that food combination which is claimed to be of particular benefit to health it would seem to be far more important to concentrate on having a well-planned and varied menu than to worry about food combinations and rules about when food is or is not to be eaten.

---

[*] A dietary pattern is a list of foods to be eaten in the course of a day and is compiled from a study of the body's requirement of individual nutrients.

[†] An enzyme is a member of a wide group of substances present in plants and animals and which bring about many of the chemical changes essential for the life of the organism. They are responsible for the digestion of foods, the clotting of blood, and the breakdown of sugar so that it may be used for muscular work.

[‡] Carbohydrate is a general term for the group of food constituents which includes all types of sugars, starches, and cellulose. (Cellulose is found more especially in the supporting structures of plants, such as the stalks of cabbage and cauliflower.)

Ovenware

By NELL MACPHERSON, Field Officer in Rural Sociology, Department of Agriculture, Auckland

WHETHER one is buying a complete set of ovenware to outfit a new kitchen or replacing broken or worn-out utensils it is wise to select pieces which will give long wear. Ovenware is available in a variety of materials, shapes, and sizes and consideration must be given to the qualities of the material and how they fit in with the purposes for which the utensil will be used.

IT is more sensible to take time buying a few good-quality, well-chosen utensils than to spend the same amount buying a larger number of poorer-quality pieces or pieces which do not exactly fulfil their purposes but which are attractively arranged in a shop or are offered at bargain rates. The price of any article is based on the quality of the material, the design and workmanship, and the finish.

Aluminium, ceramic, earthenware, enamelled iron, heat-proof glass, cast iron (heavy), tin-plate, and tinned ironware are commonly sold as oven utensils. No material is superior in all respects to any other, but each has special qualities which fit it for particular uses (see table on page 399).

Utensils should have a smooth surface, few, well-made joins, flat bottoms, neat, well-made handles of a good size, and no sharp corners. Rounded corners are easy to clean.

Finish

Different materials have different finishes applied to the surface to improve the durability and use of the article, for example, glaze on pottery, tin-plate on iron, or enamel on iron. These finishes should always be smooth and even, and free from bubbles and cracks.

Edges should be rounded and free from sharp surfaces and easy to clean. Joins should be smooth and neat. Handles if attached with rivets should be firm.

The material and the finish should not be affected by grease, food acids, or alkalis. The Food and Drugs Regulations lay down the requirements for enamelled vessels to be used for preparation of foods, and people who wish to buy enamelware may be satisfied that it is safe for all purposes. A decorative finish, though it may improve the appearance, will increase the cost of an article without increasing its usefulness. Ovenware which is also used as a serving dish, for example, a casserole, sometimes has applied decoration added to the surface.

Suggestions for a Minimum List of Ovenware

2	oven slides
1	large roasting pan
1	casserole and cover (medium size)
1	deep pie dish (medium size)
1	pie plate (8 to 10in.)
1	loaf tin
1	pair of sandwich tins
1	pair of patty pans
1	set of deep cake tins

Desirable Extra Pieces

1	oven slide
1	small casserole and cover
1	small pie dish
1	pie plate
1	gem iron
1	shallow sheet sponge tin
2	ring cake tins and 1 tube tin

Measure the oven before buying utensils, then buy ones which will fit in together if necessary. If the pieces touch each other in the oven or the oven is crowded or they touch the sides, the circulation of the heat will be uneven, and this will cause uneven cooking of foods.

Oven slides are usually sold with the stove, but replacements and spares can be bought separately. They are made of steel or tinned steel or aluminium.

Roasting pans also are usually sold with the stove, but may be bought separately. They are made of tinned iron, enamelled iron, aluminium, and tin-plate. Smooth, rounded corners and a smooth, flat curve where the sides and bottom meet are easier to clean. Folding handles are often convenient, but the grip should be comfortable, because a pan of hot fat holding a joint is heavy and awkward to lift.

Casseroles: Made of heat-proof glass, glazed earthenware or ceramic ware, and enamelled iron, these nearly always have covers. Two side handles on the cover are easier to use than one recessed handle in the centre. Some casseroles have indentations on the cover so that the condensed moisture will return to the food over the whole surface and not only down the sides of the dish. These are suitable for use at the table. Some are sold with stands for this purpose. Casseroles are also used for souffles and custards. The cover may be used as a vegetable dish.

Bread tins are made of tin-plate or aluminium and should have a reinforced, rolled edge. Rounded corners and a curve where the sides meet the bottom make cleaning easier.

FRIGIDAIRE

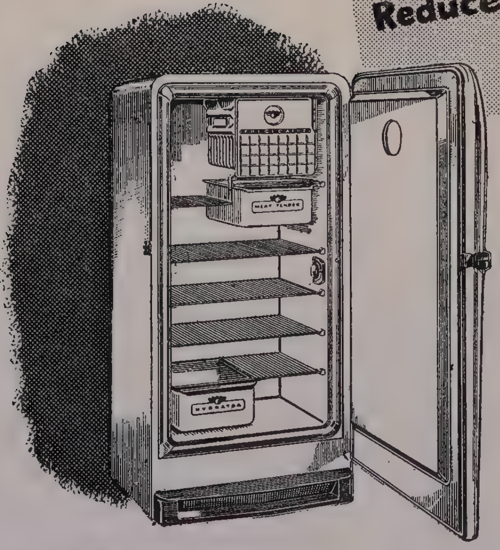
REGISTERED TRADE MARK

Price Reduced

Quality Unchanged

7·4 cubic feet MODEL

Reduced to **£135**

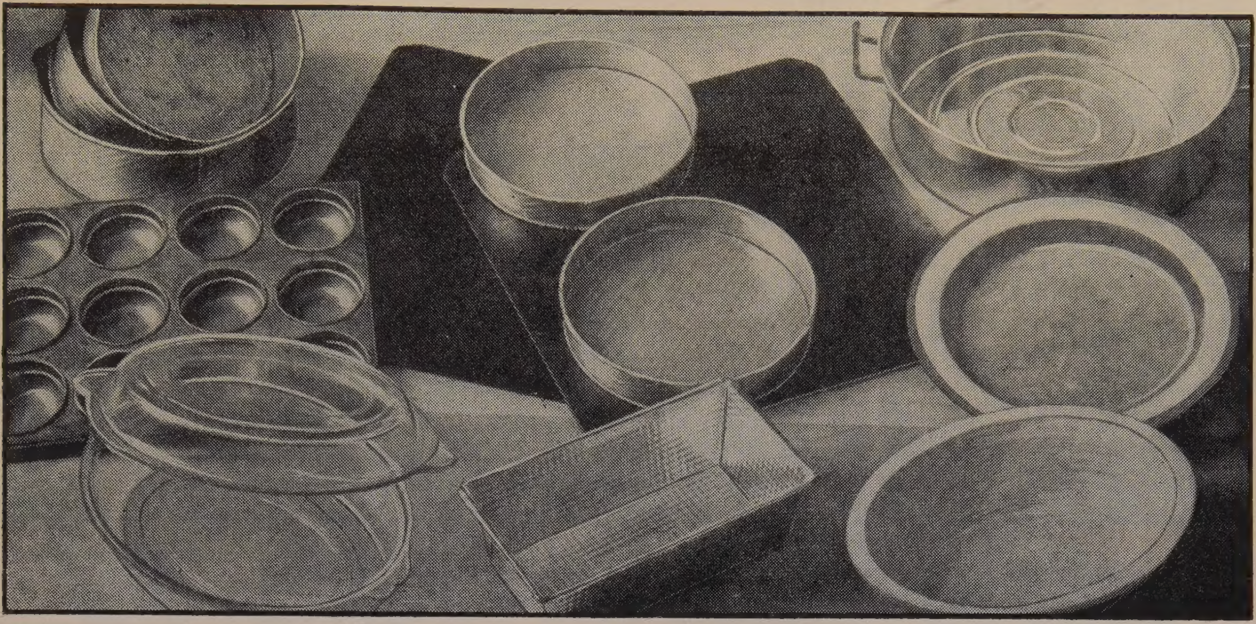


- *FREE INSTALLATION*
- *IMMEDIATE DELIVERY*
- *FULLY GUARANTEED*
- *EASY TERMS AVAILABLE*

Made only by **GENERAL MOTORS**

Distributed by— **FRIGIDAIRE** DIVISION OF GENERAL MOTORS NEW ZEALAND LIMITED.

Through a New Zealand-wide Network of Authorised Frigidaire dealers.



Suggestions for a minimum set of ovenware.

Patty pans are usually made with 6, 9, or 12 cups. The ones with no rims around the cups are the easiest to use and clean. Similarly the ones with no pattern in the bottom of the cup are easier to use and clean. They are usually made of tin-plate or aluminium.

Gem irons are usually made of cast iron or aluminium. They must be kept greased to prevent rusting if made of cast iron. There are usually 6 or 12 sections in a gem iron, which should have good hand grips at each end.

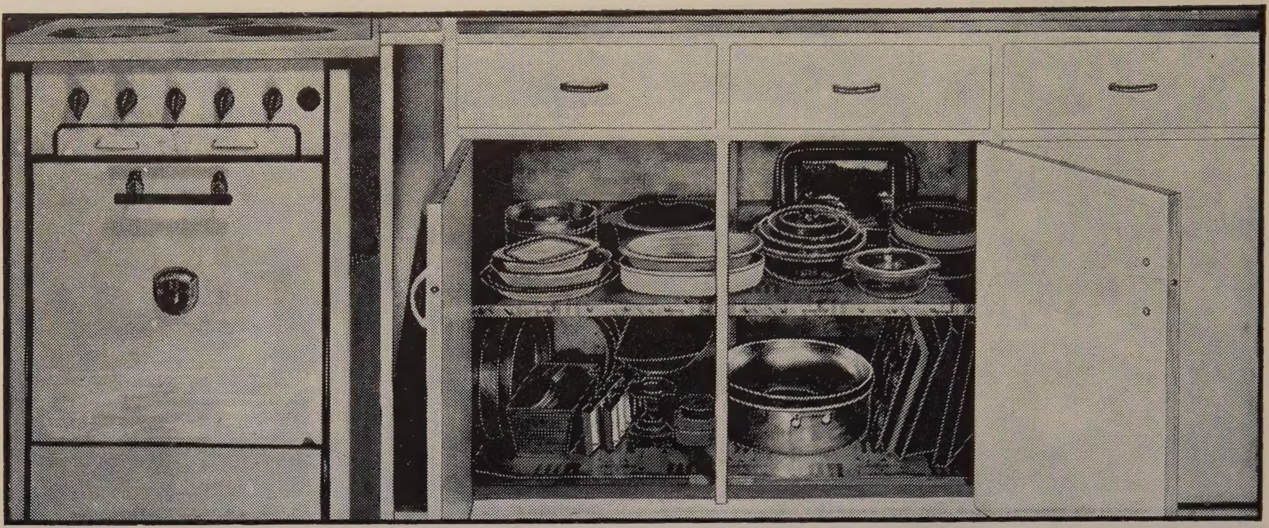
Deep cake tins are usually made of tin-plate or aluminium. The joins should be very neat to prevent the batter or dough from entering them.

Sandwich tins are usually made of tin-plate or aluminium. The rim should be neatly finished.

Sheet sponge tins and sponge roll tins are usually made of tin-plate and should have straight sides to give the cake a good appearance.

Qualities of Different Types of Ovenware

	Aluminium	Ceramic	Earthenware	Enamelled iron	Heat-proof glass	Cast iron (heavy)	Tin-plate and tinned iron
Appearance	Silver grey, fair	Plain or patterned, good	Brown, good	White, grey mottled, or coloured, good	Clear or opaque, good	Blue - black, unattractive	Silver when new, fair
Ease of cleaning	Fair, can mark sink, etc.	Good if glaze intact	Good if glaze intact	Good if enamel coat intact	Good	Fair, rusting must be prevented by greasing	Fair if tin-plate intact, darkens on heating
Conduction of heat and retention of heat	Even and fast conduction, but cools quickly	Even, slow, conduction, but cools slowly	Even, slow conduction, but cools slowly	Even, medium fast conduction, but cools fairly slowly	Even slow conduction, but cools slowly	Even, fairly fast conduction, but cools fairly slowly	Even, fast conduction, but cools quickly
Effect of sudden change of temperature	None	May break or crack or glaze may craze	May break or crack or glaze may craze	Enamel may crack or splinter	May crack or break	None	May warp
Weight	Light	Fairly heavy	Fairly heavy	Fairly heavy	Fairly heavy	Heavy	Light
Effect of food acids	Brighten surface	None	None	Tend to pit surface if left on for long	None	None	None
Effect of alkalis such as soda	Blacken surface and can cause pitting	None	None	None	None	None	Slight pitting effect
Effect of dropping or jarring	May dent, but use is not impaired	May break	May break	Enamel may splinter or chip	May break	None	May dent, but use is not impaired
Effect of scouring powders and pads	Make fine scratches on surface	May scratch glaze	May scratch glaze	May scratch glaze on enamel itself, to expose iron, which will rust	None	May remove protective coat of grease and allow rusting	May remove tin-plate and allow rusting



Storage of ovenware. Articles which fit one within the other may be stored in this way, but glass, earthenware, and ceramic ware must be handled with special care.

Ring cake tins are usually made of aluminium. The centre should be level with the top edge of the tin and the bottom of the ring should be narrower than the top to allow the cake to come out easily.

Tube tins consist of a sheet of tin-plate with fastening clips and two end caps. They are easy to clean and use, but are not always easy to store.

Pie dishes are available in heat-proof glass, glazed earthenware, ceramic ware, tin-plate, enamelled iron, and aluminium. The first three are more satisfactory for table use. Pie dishes are also used for souffles and custards. The bottom half of a casserole may be used for a pie dish.

Pie plates are available in heat-proof glass, glazed earthenware, ceramic ware, aluminium, tin-plate, and enamelled iron. The first three are more suitable for table use. The top half or cover of a casserole makes a good pie plate.

Care and Storage

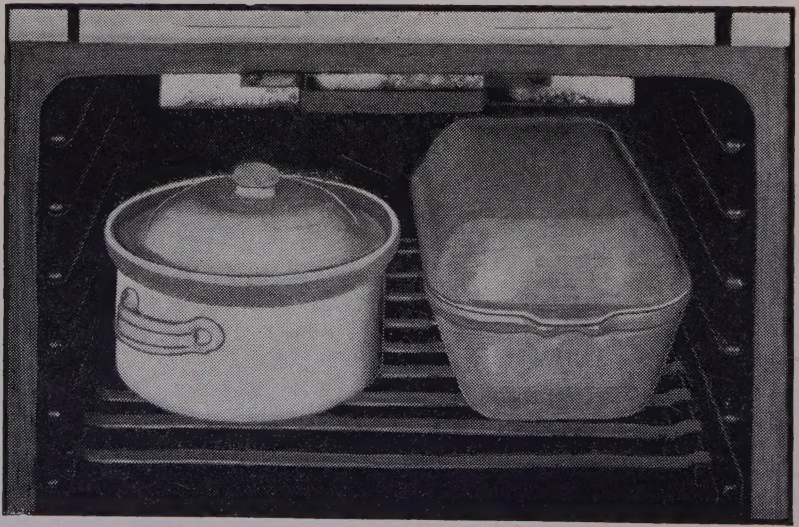
Because all ovenware is used in the preparation of food, it must be kept clean and in good condition. If any piece is wiped free of excess grease with crumpled newspaper, rinsed, and washed in hot soapy water and dried, it will simplify the task of keeping it in good condition. As sudden changes in temperature can cause cracking, breaking, or warping in most of the materials used, it is wise to allow the utensils to cool slowly before putting them into water or on to a cold surface. For this reason alone wooden stands or chopping boards are useful, because the surface is not too cold.

Stains on the outside of oven equipment are generally due to burnt-in food or grease and can best be removed by soaking the utensils in water and then using a fine-grained scouring powder on a cloth. The darkening of tin-plate equipment after use is due to the action of heat, and general darkening should not be scoured to brighten the utensil, because bits of tin may be removed. Tin-plate utensils which have bits of food stuck on them should be soaked in water to soften the food, which can then be removed by washing thoroughly. Stains and burnt-in foods on the inside of a dish are best removed by soaking.

If burnt-on foods are difficult to remove, they may be dislodged by using a wooden peg. Sharp metal tools and coarse abrasives should not be used. In removing stains and food from any glazed utensil it is important not to damage the glaze, as earthenware is porous and it will absorb stains and food flavours, which make it unfit for use. In cleaning enamelware it is important not to scratch the enamel, as the iron may be exposed and will rust.

It is important in cleaning any ovenware not to scratch the surface, as food will stick to scratched surfaces more quickly and is more likely to burn.

In storing ovenware it is wise to store the equipment most often used in a readily accessible place. Articles which fit one within the other may be stored in this way, but with glass, earthenware, and ceramic ware care in handling is important to prevent chipping of edges. Iron and tinned utensils should be stored in a dry place with the lids off to prevent moisture from condensing in them and causing rust. Oven slides, roasting pans, and sheet sponge tins take less room if they are stored vertically near the stove. Casseroles, patty pans, bread tins, and cake tins are best stored near the baking or food-preparation bench. Pie dishes and pie plates should also be stored near the baking bench.

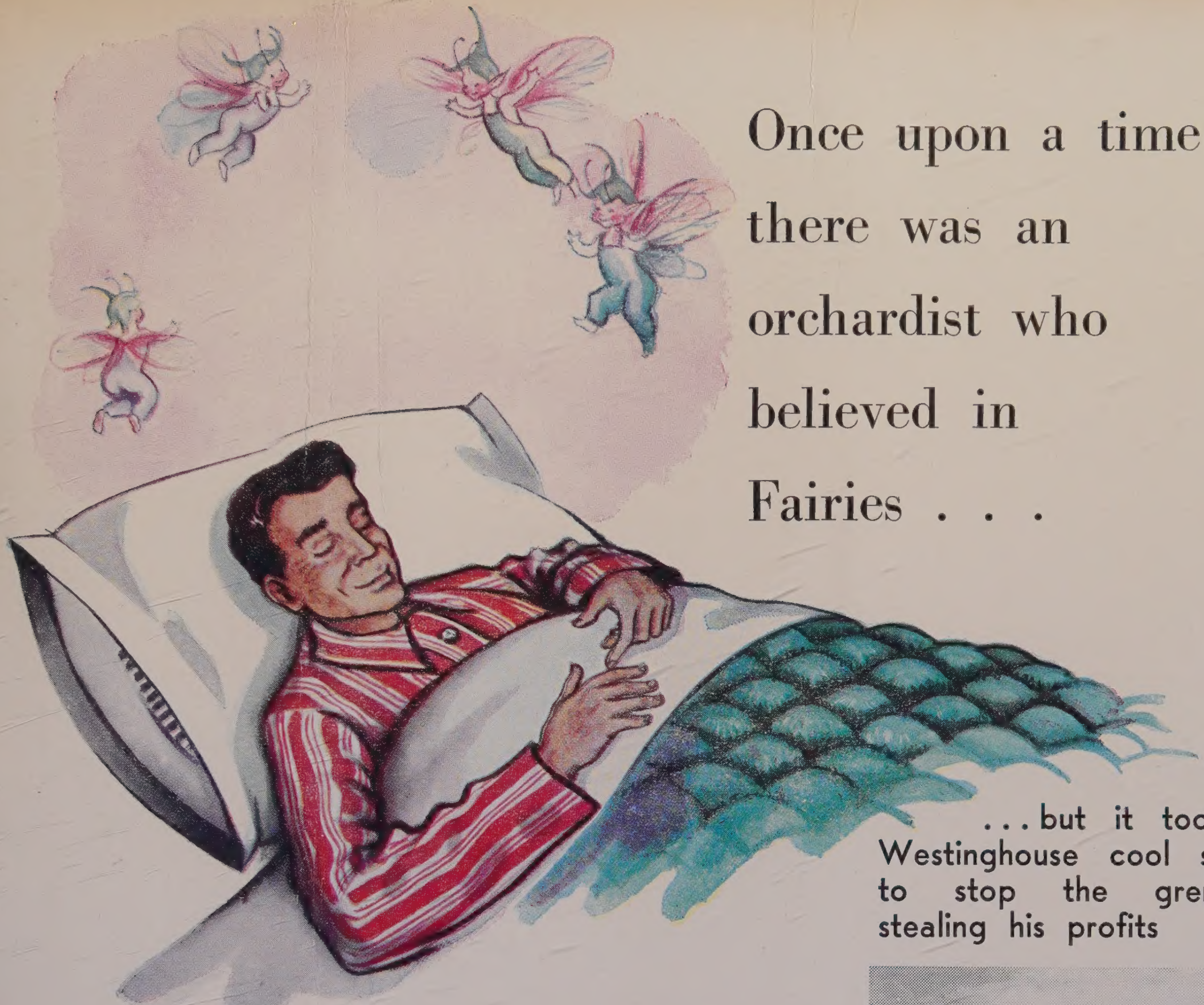


Two casseroles which fit into the oven and yet allow free circulation of heat.

All photographs by Sparrow.

Printed by Blundell Bros. Ltd. (The Evening Post), Wellington— 35623

Once upon a time there was an orchardist who believed in Fairies . . .



. . . but it took a Westinghouse cool store to stop the gremlins stealing his profits

"TREVOR the Trusting" they called him. He trusted in the weather being right just when **he** planned to harvest. He trusted in transport arriving in time to take his fruit to market. But the fairies let him down. Then he turned to Westinghouse to help him out! Today he's a realist again . . . trusting in the security of his cool store to guard the fruit of his labours!

NO HARVESTING WORRIES

With a Westinghouse cool store on your land you can harvest as the fruit ripens. Harvest it and store it **tree-fresh.** Controlled temperature within the store keeps your fruit prime and perfect until market-day.

NO STORAGE WORRIES

Apples, pears, plums, nectarines, peaches, small and citrus fruit store them all! Put them in when you like . . . take them out when you like! No rot . . . no waste . . . no worry!

MORE REAL PROFIT

Every case of fruit you save from rotting or deterioration means more money for your family. Why not ask a Westinghouse man to quote you for **your** cool store. The address of your nearest agent is listed below.

RIGHT: A typical Westinghouse orchard cool store. Can be built new or existing sheds converted.

PUT YOUR TRUST IN TWO GREAT NAMES IN REFRIGERATION . . .

WESTINGHOUSE and RECOLD

H. W. CLARKE (N.Z.) LTD. 42-46 Cable St., Wellington, 105 Anzac Avenue, Auckland. 256 Cashel St., Christchurch. 1 Cliff St., Timaru. 84 Tainui St., Greymouth. 28a Bridge St., Nelson. 78 Fitzherbert Avenue, Palmerston North. H. W. Clarke, 399 Moray Place, Dunedin.

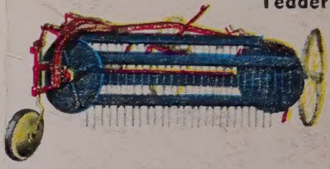
THE WAY TO MAKE HAY PAY

McCORMICK
INTERNATIONAL

The **GL-25-VO and the B-21-U Universal-Type Power Mowers** fit almost any tractor.
Features include—Automatic pitman, safety-slip clutch, oil bath lubrication. The cutter bar has an automatic safety release, re-set by simply reversing the tractor.

**GL-25-VO
or
B-21-U
Mower**

Steel frame construction of the **F-PB-2 Side-Rake and Tedder** gives solidity and stability. Gears run in an enclosed oil-bath. Spring teeth are quickly removable. Side-Rake immediately and easily converted to Tedder by moving a lever.


**F-PB-2
Side-Rake
and
Tedder**

With the **No. 45 Pick-up Hay Baler,** one man can handle 240 Bales per hour. Worked off the power take-off of almost any medium-power tractor, the machine delivers bales securely knotted with twine. Bale size, density and pick-up height are adjustable for different crops.

**B-45
Pick-up
Baler**

The **McCormick International Bale Loader** is easily attached to any trailer, truck or tractor, and the driver of the vehicle and one other man can between them easily load a whole haycrop. The Bale Loader has a simple, ground-drive mechanism and will pick up bales side-on or end-on.

**McCormick
International
No. 3
Bale Loader**

See your nearest **IH** *Company Dealer for full information.*

INTERNATIONAL HARVESTER

INTERNATIONAL HARVESTER CO. OF N.Z. LTD.